

- VERBENA LITORALIS* f. *ALBIFLORA* (Mold.) Mold., stat. nov.
Verbena litoralis var. *albiflora* Mold., Phytologia 1: 432. 1940.
- VERBENA LITORALIS* f. *CONGESTA* (Mold.) Mold., stat. nov.
Verbena litoralis var. *congesta* Mold., Phytologia 20: 80. 1970.
- VERBENA PERENNIS* f. *JOHNSTONI* (Mold.) Mold., stat. nov.
Verbena perennis var. *johnstoni* Mold., Phytologia 2: 150. 1946.
- VERBENA PLICATA* f. *DEGENERI* (Mold.) Mold., stat. nov.
Verbena plicata var. *degeneri* Mold., Phytologia 2: 24--25. 1941.
- VITEX GLABRATA* f. *BOMBACIFOLIA* (Wall.) Mold., stat. nov.
Vitex bombacifolia Wall., Numer. List [48], no. 1749, hyponym. 1829; C. B. Clarke in Hook. f., Fl. Brit. India 4: 588. 1885.
- VITEX GLABRATA* f. *PALLIDA* (Wall.) Mold., stat. nov.
Vitex pallida Wall., Numer. List [48], no. 1751, hyponym. 1829; C. B. Clarke in Hook. f., Fl. Brit. India 4: 588. 1885.
- VITEX HARVEYANA* f. *GEMINATA* (H. H. W. Pearson) Mold., stat. nov.
Vitex geminata H. H. W. Pearson in Thiselt.-Dyer, Fl. Cap. 5: 213--214. 1901.

ADDITIONAL NOTES ON THE GENUS *VITEX*. XIII

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Vitex Tourn.

Additional & emended bibliography: R. Br., Prod. Fl. Nov. Holl., imp. 1, 1: 511--512 (1810) and imp. 2, [Isis 1819:] 511--512. 1819; Jack, Malay. Misc., imp. 1, 47. 1820; Jack, Descrip. Malay. Pl., imp. 1, 47. 1822; Jack, Calc. Journ. Nat. Hist. 4 (13): 40--41. 1843; W. Griff., Notul. Pl. Asiat. 4: 173, 178--179, 181, 740, & 764. 1854; Koord. & Valet., Meded. Lands Plant. Bat. 42 [Bijdr. Booms. Java 7:] 164 & 198--211. 1900; Pobéguin, Pl. Méd. Guin. 340. 1906; King & Gamble, Journ. Asiat. Soc. Beng. 74 (2 extra): 841--857. 1908; Bėjaud, Essenc. Forest. Camb. 348. 1928; Dop in Lecomte, Fl. Gén. Indo-chine 4: 776 & 811--848. 1935; Hansford, Proc. Linn. Soc. Lond. 153: 9. 1941; Hansford & Deight., Mycol. Paper IMI.23: 70. 1948; R. Br., Prod. Fl. Nov. Holl., imp. 3, 511--512. 1960; Rougeot, Inst. Franç. Afr. Noire IFAN. 14 (4). 1962; F. G. Browne, Bull. Ent. Res. 54: 229--266. 1963; Aubrév., Bois For. Trop. 93: 30. 1964; Schnell, Mém. Soc. Bot. France 113: 121--132, fig. 61. 1966; Jack, Descrip. Malay. Pl., imp. 2, 7: 47. 1977; Jack, Malay. Misc., imp. 2, 47. 1977; Mold., Phytologia 44: 216--232. 1979.

Bentham (1876) comments that "In Benth. Fl. Austral. v. 66 drupa

Viticis errore 4-pyrena dicitur; endocarpium undique continuum est v. rarissime vix separabile".

Pobéguin (1906) cites *Kouroussa* 230, 232, 682, 810, & 1255, *Teliko* 799, and *Timbo* 741 from the Republic of Guinea as unidentified species of *Vitex* known locally as "ba coudou nē", "coudou", and "kougou".

VITEX AGNUS-CASTUS L.

Additional bibliography: Mold., *Phytologia* 44: 218, 220, & 225--232. 1979.

Additional & emended illustrations: A. C. Martin, *Am. Midl. Nat.* 36: 609, pl. 50. 1946; Parsa, *Fl. Iran* 4 (1): 539, fig. 254. 1949; Hottes, *Book Shrubs*, ed. 5, 404 (1950), [ed. 6, imp. 1], 404 (1952), and [ed. 6, imp. 2], 404. 1954; Humbert, *Fl. Sahara Sept. Cent.* [406], fig. 149. 1958; Hottes, *Book Shrubs*, [ed. 6, imp. 3], 404. 1959; Viertel, *Trees Shrubs Vines* no. 407. 1959; Hatton, *Handb. Pl. Floral Orn.* 368, fig. 727. 1960; Fournier, *Quat. Fl. France* 807, fig. 3353. 1961; Humbert, *Fl. Sahara Sept. Cent.*, imp. 2, [406], fig. 149. 1962; Lonicer, *Kreuterb.*, imp. 2, 77. 1962; Tur-rill, *Curtis Bot. Mag.* 174: pl. 400 (in color). 1962; Graf, *Exotica* 3: 1481. 1963; R. L. Taylor, *Pl. Colonial Days* 22. 1964; Polunin & Huxley, *Flow. Medit.* 42, pl. 16, fig. 394. 1966; Capite, *Vitex Agn. Oss. Isto-anat.* 8, 9, 11, 13, & 15, fig. 1--9. 1967; W. Trelease, *Wint. Bot.*, ed. 3, imp. 2, 335. 1967; Wilson & Bell, *Fragrant Year* 186. 1967; A. & I. Nehrling, *Easy Gard. Drought-Resist. Pl.* 227. 1968; Polunin, *Field Guide Flow. Eur.* pl. 106. 1969; Polunin, *Flow. Europe* pl. 106-1097 (in color). 1969; J. V. Watkins, *Fla. Landsc. Pl.*, ed. 1, imp. 1, 306. 1969; Viertel, *Trees Shrubs Vines* no. 407. 1970; Perrot & Paris, *Pl. Médic.* 1: fig. 1--7 (in color). 1971; Polunin, *Pflanz. Europ.* pl. 106 (in color). 1971; R. G. & M. L. Br., *Woody Pl. Md.* 289. 1972; Polunin, *Concise Flow. Eur.* 106, pl. 1087 (in color). 1972; Townsend, *Kew Bull.* 27: 148, fig. 1 (left). 1972; J. Hutchins., *Fam. Flow. Pl.*, ed. 3, 487, fig. 243. 1973; Serbanescu-Jitariu & Mitroiu, *Act. Bot. Hort. Bucurest.* 1972-73: 109, pl. 1, fig. 5. 1973; J. V. Watkins, *Fla. Landsc. Pl.*, ed. 1, imp. 4, 306. 1973; Little, Woodbury, & Wadsworth, *Trees P. R. Virg. Isls.* 2 [Agric. Handb. 449]: 865, fig. 684. 1974; J. V. Watkins, *Fla. Landsc. Pl.*, ed. 1, imp. 5, 306. 1974; Gerarde, *Herbal*, imp. 3, 3: 1387. 1975; Seabrook, *Shrubs Your Gard.* 130 (in color). 1975; Batson, *Gen. East. Pl.* 147. 1977; Speta, *Candollea* 32: 155, fig. 2x. 1977; Heathcote in Heywood, *Flow. Pl. World* 237, fig. 3. 1978; D. E. Clark, *Sunset New West. Gard. Book*, ed. 4, 498. 1979.

Recent collectors describe this species as a large, fast-growing, deciduous shrub, 1.5--7 m. tall, aromatic, spreading or dense, with several stems, the branches erect to ascending, the foliage pungent-spicy when crushed, with the aroma of lavender or garden sage, the flowers pleasantly lavender-scented when bruised. The corollas are said to be "lilac" in color by Blackburn (1952) and Graf (1963), "violet or blue" by Dean (1968), "light hyssop-violet" by Turrill (1962), "pale-violet" by Makins (1936) and Munz (1968), and "bright-violet" by Parker (1924). They are said to have been "violet-blue"

on *Shinners 8582*, "blue-violet" on *Gillis 8449*, "light-purple" on *Bayliss BS.6236*, "purple or lighter" on *Witham 304*, "mauve" on *Bayliss BS.5095 & 7270* and *Sykes 16/68*, "bright-mauve" or "lavender-mauve" on *Bayliss BS.4542*, and "purplish outside, dark-purple within" on *Abedin 7403*.

Recent collectors have found this plant growing in thickets, *Pinus sylvestris* forests, in partial shade on blackland clay, in sandy loam, on seashores, on mostly limestone soil, in dry riverbeds, and on dry riverbanks, at altitudes of sealevel to 1300 meters, flowering from June to August, in fruit in July, August, and October.

Embarger (1960) reports the chromosome number of *Vitex agnus-castus* as $2n = 24$ and the same number is reported by Paterman (1935), while Sugiura (1936), Paterman (1938), and Sharma & Mukhopadhyay (1963) report 32; Darlington & Wylie (1956) say " $x = 6, 8$ ". Löve (1971) reports the number as $2n = 32$, based on *Murin & Sheikh s.n.* from Iraq. Trelease (1967) illustrates the longitudinal and cross-section views of the twigs, as well as the appearance of the leaf-scars and buds. His reference, however, to C. K. Schneider's "f. 191" seems to be an error since that figure in Schneider's work has nothing whatever to do with *Vitex agnus-castus*. Similarly, Imboden's statement that this is a "tree or shrub glabrous to tomentose or villous throughout -- from Baja California to Sonora [Mexico] and Chihuahua to Oaxaca" is quite erroneous -- probably meant to apply to *V. mollis* H.B.K. instead. Etchison adds that "This is an aromatic tree that grows to 30 feet [and] is found in dry sunny situations. I doubt if *Vitex agnus-castus* ever attains a height of more than 15 feet. Theophrastus, however, according to Knobloch (1948), in his "definitions of the various classes into which plants may be divided" asserts that *V. agnus-castus* is one that "increases in stature under cultivation, so that they become trees and yet they belong to the class of shrubs".

Speta (1977) says that "an der Ansatzstelle der Filamente befinden sich mehrzellige, verzweigte Haare, deren Kerne dicht mit feinen Kristallamellen angefüllt sind".

Serbanescu-Jitariu & Mitroiu (1973) describes the pollen, based on *Herb. INCEF 3335*, as follows: "subprolat; 3-colpat; văzut apical 26--46,8 μ in diam., din profil înalt 33,8--46,8 μ , lat 26--33,8 μ . Polenul scuturat din antere și văzut cu ochiul liber, este galben, în apă la microscop, portocaliu brun, iar în chloralhidrat, galben-cenușiu. Sporoderma crassisexinată cu o grosime de 2,6 μ ; exina prezintă în secț. optică o structură tehilat-baculată, iar suprafața este aciperită cu veruculi neuniform distribuiți. Colpii 2/3 din raza microsporilor, sînt înguști și ascuțiți spre capete."

Battandier & Trabut (1902) report that *V. agnus-castus* occurs in the littoral zone in Algeria and Tunisia; Maire asserts that it is both "cultivated and escaped" in Egypt; Fedtschenko (1913) lists it as cultivated in Turkestan (Russia). Bayliss records it as wild in Zululand and as cultivated in the "subtropic area of

South Africa" [Transvaal]; Knoche (1974) lists it as cultivated in the Balearic Islands. Marco & Mossa (1973) describe it as Euro-mediterranean and report it as "rare" on Sardinia. Innamorati (1973) found it in Morocco, while Roberty (1974) lists it as cultivated in what was French West Africa. Humbert (1958) encountered it in the northern and central Sahara: "Sud oranais, rare (Vallée de la Zousfana et probablement ailleurs; lits d'oueds, bord des mares". Speta (1977) records it from the island of Bræ, Jugoslavia. Bischoff (1831) asserts that it is sometimes cultivated in Germany; Priszter (1971) says that it is cultivated in Hungary and offers seed of it as his seed no. 1672 in trade. Molina (1976) lists it as cultivated in Honduras, while Adams (1972) reports it cultivated on Jamaica. Sherk & Buckley (1968) refer to it as "hardy" in Canada only in the province of British Columbia. Radford & al. (1964) found it "rare in pastures" in Darlington County, South Carolina, where it flowers in June and July. McGregor & al. (1977) report it from Cleveland, Custer, Grady, and Payne Counties, Oklahoma. Hyland (1967) reports it cultivated in Maryland, grown from seed no. 263177 from Israel, 17720 from Baja California Norte, Mexico, 269411 from Afghanistan, 307618 from Turkey, and 259959 collected by Gentry in Mexico.

Sweet (1826), Bean (1956), and Fletcher (1972) tell us that *V. agnus-castus* is "said to have been cultivated in the British Isles since 1570", introduced from Sicily; Loudon (1832) give the date as "1590". Stalter (1972) found it in Georgetown County, South Carolina; Greuter (1976) reports it from Psaya island in the Aegean Sea. Patzak & Rechinger (1967) give its natural distribution as "Regio Mediterranea, Asia austro-occidentalis et centralis usque ad Turcomaniam et montes Pamir-Alaz", asserting that the type population "Habitat in Siciliae ad Napolis paludosis".

Bicknell (1896) found the species "along roads and torrents" in western Liguria (northwestern Italy), while Sommier & Caruana Gatto (1915) record it from Comino, Cozo, and Malta islands, noting that "A Malta à quasi distrutto. A Gozo forma ancora in alcuni luoghi dei piccoli boschetti. Varia a fiori bianchi." Huber says that it "is occasionally cultivated" in west tropical Africa; LeGrand (1887) lists it from France and southern Germany; Pampanini (1930) lists it doubtfully from Cyrenaica: "La presenza del *V. Agnus-castus* spontaneo a Tocra mi è incerta perchè il Dott. H. Scaetta lo segnalò senza alcuna indicazione in proposito, mentre in seguito...lo indicò come coltivato." Lakela & al. (1976) report it "planted, escaping locally" in the Tampa Bay area of Florida, blooming there in spring and summer; Bouloumoy (1930) lists it from streamsides in Lebanon and Syria. Parker (1924) writes that it is cultivated on the plains of the Punjab where "It is very hardy both as regards cold and drought". Horowitz (1969) calls it "a hydrophile among trees on the banks of the Jordan river" in Palestine. Munz (1968) notes that it is "Found in alkali sink e. of Weedpatch, Kern Co.", California; Maheshwari (1963) reports it from "shrubberies of parks and gardens" in Delhi, India. Linnaeus (1753) and Rauschel (1797) report it from Sicily.

According to Bayliss it flowers in the autumn in South Africa. Quézel & Pamukçuoğlu (1973) report finding it growing with *Phragmites communis*, *Holoschaemus vulgaris*, *Paliurus australis*, and many *Ephedra fragilis* in maritima zone areas. Picci reports it from Molara island off the coast of Sardinia. The Browns (1972) found it becoming naturalized in Maryland. Dean (1968) avers that it "Grows in gardens, roadsides, waste places" on the coastal plain from Florida to Texas and north to North Carolina [U.S.A.] Bailey (1972) reports that "Like *Buddleia*, this species may die back to the ground in severe winters" but actually is hardy in Zone 7 in the United States.

Turrill (1962) says "a *V. negundo* L. foliolis lanceolatis vel anguste lanceolatis, corolla circiter 8 mm. longa, staminibus styloque exsertis, corollae lobis plusminusve aequilongis inter alia recedit". Jafri & Ghafoor, in a personal communication to me, add that "in *V. agnus-castus* the leaflets are 5--7 and the cymes sessile or subsessile, forming a subcylindrical narrow inflorescence, the flowers fragrant, while in *V. negundo* the leaflets are 3--5, the cymes are often somewhat lax and paniced, forming a pyramidal inflorescence, and the flowers are not fragrant."

Palmer & Pitman (1972) remind us that "agnus-castus" is derived from the Greek *hagnos* and the Latin *castus*, both signifying "chastity". They also note that "The generic name *Vitex* is said to be derived from the Latin *vieo*, meaning 'to plait', because of the flexibility of the shoots. Pliny used the name for a willow-like species which has ever since been known as the 'chaste tree', for the remarkable reason that it is believed to have the power of subduing the passions. 'For that the dames of Athens', Pliny assures us, 'during the feasts of the goddess Ceres...made their pallets and beds with the leaves thereof, to coole the heat of lust and to keep themselves chaste for the time'."

Little, Woodbury, & Wadsworth (1974) give a rather detailed distribution for *V. agnus-castus*: "Native of the Mediterranean region from southern Europe and Morocco to western Asia including Turkey, Iraq, and Pakistan, but widely planted for ornament and escaping from cultivation and naturalized in tropical and subtropical regions including West Indies. Also southeastern United States from Florida to Texas and California and north to New York and beyond, where the plants are killed to the ground in winter."

Emberger (1938) says "Le Gattilier est répandu dans tout le bassin méditerranéen jusqu'en Asie Centrale. Le centre de dispersion du genre est l'Asie Sud-orientale. Notre espèce est la seule Verbénacée ligneuse d'Europe et de l'Afrique septentrionale [this is untrue: other woody *Verbenaceae* in north Africa are found in the genera *Chascanum*, *Svensonia*, *Clerodendrum*, *Lantana*, *Premna*, and *Vitex*]....Il n'est pas douteux que cette espèce est chez nous un survivant tertiaire." He also says that "Ce petit arbre habite le bord des rivières et le lit des Oueds intermittents de la plaine et des basses montagnes de tout le Maroc jusque dans l'Anti-Atlas, mais dépasse rarement l'altitude de 1.000 mètres. Il

forme, avec le Laurier-rose et les *Tamarix* le fond décoratif de notre végétation ripicole."

Van Melle (1943) reviews the characters of *V. agnus-castus* and *V. negundo* as cultivated shrubs, telling us that they are both "highly decorative, tender-wooded shrubs which, in mild climates, grow to a considerable height and width but are best treated in our zone by way of die-back shrubs; that is, pruned close to their base every spring and then permitted to put on their annual growth, to a height of 3 or 5 feet, on which they will bear their showy terminal panicles of small, fragrant flowers which, in the better forms, are a good lavender-blue.

"In *V. Agnus-castus* these are arranged the more showily in paniced spikes, appearing in July to September; in *V. Negundo* they come in loose panicles, in July and August.

"In both kinds the total effect of the foliage is grayish, the leaves having a gray-woolly hairiness on the lower surface..... They are effective, but rather exotic-looking and erect shrubs, not easily blended in the border and perhaps better used by way of garden accent plants or 'cut-back' garden hedge-rows. They flower at a time when there is not much else in bloom among the shrubs and, in the better, lavender-blue forms, contribute a worth-while decorative note to the small landscape.

"They thrive well in light, sandy soils, in full sun. Being coarse-rooted and difficult to dig with a ball of earth, they are best transplanted bare-rooted, in the spring.

"When they are treated as die-backs, the tenderness of the top-growth need not worry one. The roots are hardy enough; and should an occasional plant be lost in severe winters, these shrubs are worth planting again."

Spach (1840), speaking of it in France, says: "Cette espèce.... est commune dans l'Europe méridionale, aux borde des ruisseaux et dans l'autres localités humides; elle fleurit en juillet et en août. On la cultive comme arbrisseau d'ornement, mais, dans le nord de la France, elle ne résiste pas aux hivers rigoureux, à moins d'être plantée dans une situation abritée."

Among the many vernacular names reported for *V. agnus-castus* are the following: "Abraham-balme", "Abraham's balm", "Abrahamsbaum", "agneau chaste", "agno casto", "agno-casto", "agnos", "agnus", "agnus castro", "agnus castus", "agnusperma", "agonos", "aignel chaste", "alfadgi", "alfagi", "alfagradi", "aloc", "amerine", "angarf", "aoubré dé pèbré", "arbor Abrahæ", "arbre au poivre", "arbre-au-poivre", "arieгна", "árvore de vastidade", "athlak", "bangaleh", "bantafelon", "bardé", "barmagh aghaji", "bish", "blue vitex", "bou mettin", "castóm", "chaste-lamb-tree", "chaste tree", "chaste-tree", "chastetree", "chast-lamp-tree", "chast tree", "chast-tree", "chencherenche", "common chaste-tree", "common chastetree", "daribrahim", "elaeagnon Theophrasti", "elcaseiro", "el-kharomâ", "erba dé la chinchas", "European chaste tree", "felfel", "felfélé barri", "folfol es-saqâleba", "gang", "gatillier", "gattillo casto", "gattilier", "gattilier commun", "gatt-saonzé", "gemeiner Müllen", "gonak", "gwanik", "hab-el-faked",

"habbolfaghd", "hemp tree", "hemp-tree", "hemptree", "herbe sainte", "hhabb el faqed", "inciensso japonés", "indian-spice", "indianspice", "kafé Ebrahim", "kaff maryam", "kaf mariem", "kaf Miryam" [=the hand of Mary], "kef-mariem", "Keuschbaum", "Keusch-Lamm", "Keuschlamm", "Keuschlammstrauch", "Keuschstrauch", "kherouâc", "lâcanu", "lâgomu", "lecristicum", "le gattilier", "lignu castu", "ligos", "ligus", "ligusperma", "lygea", "mala di suerta", "malagueta", "marmandai", "marwand", "marwandi", "Mexican lavender", "Mönchspfeffer", "Mönchspfefferbaum", "monk's pepper", "monks' pepper", "monks pepper tree", "monks peppertree", "monk's pepper tree", "monk's pepper-tree", "monk's-pepper tree", "Müllen", "non's peppertree", "palo santo", "pandj-angosht", "panjangusht", "parkleuys", "pèbré", "pébriè", "pébrié fé", "pébriè saoubadjé", "petit poivre", "phontáfelyoune", "pichot pèbré", "pichoun pèbré", "pimenteira silvestre", "piper agreste", "piperella", "piper monachorum", "poivier", "poivre des moins", "poivre sauvage", "rénuka", "sage tree", "sage-tree", "sagetree", "salix alexandrina", "salix amerina", "salix graeca", "salix grossa", "salix marina", "salix maritima", "sambhálu-ke-bij", "sanguis ibis", "saulle de mer", "saulx de Gaule", "saulx gauloise", "sauz gatillo", "sauzgatillo", "Schaafmüllen", "Schafmülle", "shadjaraté Ebrahim", "shajerat Ebrahim", "the chaste tree", "totsane", "tree of chastity", "true chastetree", "vitex", "vitex agnus castus", "vitex arborea", "vitgê", "vitice", "wild-lavender", "wild pepper", "ycearea", "yerba Louisa", "zalitzunkia", "zoukhamçate-acabêê", "zuccatorium", "zuccozaria", "zucoraria", and "zu-khamsata aurak" [=the five-halved].

Many authors have listed medicinal and economic uses -- or purported ones -- for *Vitex agnus-castus*. Hartwell (1971) says that a broth made from the herbage is used to treat "superfluities of uterus" and hardness of the liver or spleen, an elixir is used for tumors, a decoction and sitzbath for hardness of the uterus and induration of the spleen, an oil and ointment for various "hardnesses or stiffnesses", and fomentations and cataplasms for induration of the spleen, corns, and chronic indurated tumors. Parks (1937) tells us that "The leaves and blossoms are used by Latin people as a preventive against moths". Innamorati (1973) says that it is used "per le malattie delle vie urinarie e dei rene". According to Grieve (1967) "The fresh ripe berries [drupes] are pounded to a pulp and dused in the form of a tincture for the relief of paralysis, pains in the limbs, weakness, etc.", while Polunin & Huxley (1966) report its use as an anti-aphrodisiac, but carefully point out that "fresh seeds have an aromatic pungency that some consider aphrodisiac". They also report the plant's use in the treatment of eye diseases and stomach-ache and as a source of yellow dye. Uphof (1968) asserts that the "herb has been used for centuries as an antiaphrodisiac" and as the source of a volatile oil; the young twigs are used in basketry; the fruits are employed as a substitute for pepper and are also supposed to be anti-aphrodisiac; "the plant was regarded since antiquity as a symbol of chastity".

Polunin (1969) asserts that *V. agnus-castus* is a plant of "Damp

places on the littoral, by streams" in Mediterranean Europe, flowering there from June to September -- "A shrub well known since classical times and associated with chastity; it is used medicinally and is a source of a yellow dye. The fruits are used for seasoning and the twigs for basket-making". De Capite (1969) describes the leaf, stem, and root anatomy in detail and reports that an alcohol extract from the leaves is active, the ether extract even more active, and the aqueous extract inactive against *Micrococcus pyogenes albus*, but no activity is seen against *Escherichia coli*.

Lewis & Elvin-Lewis (1977), along with Arevalo (1966), repeat the statement that the seeds have supposed antiaphrodisiac properties in "decreasing libido", while Al-Rawi (1964) reports the bitter-tasting seeds are boiled in ghee and given to horses in the treatment of colic, while the entire plant is used in the treatment of eye and stomach disorders and "pains due to chills; one who has caught a cold takes a bath in water boiled with the leaves". Lust (1974) avers that the plant "exhibits hormone-like properties". Burkill (1966) states that *V. agnus-castus* is "a plant used by the Romans and Greeks, both internally and for poulticing", its oil containing "cineol and other substances". According to Tornabene (1891), speaking of this species: "De virtute antivenerae hujus speciei, quam veteres et praesertim Graeci extollebant, supervacaneum est loqui, cum inter res commentitias nunc habeatur. Medici laudarunt ut remedium ad hysteriam et gonorrhoeam; sed hoc quoque exoletum." Hartwell (1971) reports a poultice made from the leaves useful in treating inflammatory tumors, while the poultice made from the seeds is used to treat hard tumors, hardness of the liver and spleen, scirrhus of the liver, and induration of the liver.

Trease & Evans (1972) also mention the antiaphrodisiac properties of the fruits, "formerly official in Spanish pharmacopeia.... In 1657 the apothecary Richard Tomlinson wrote 'it cohibits the motion of the sperm, and allayes venereous fancies in the night as well as Rue seed, for which cause the Athenian matrons in their Feasts to Ceres, the better to custodite their chastity strewer their beds with its leafs'. The constituents resemble those of the European vervain." The long-used drug made from this plant is known as "agnus castus" or "semen agni casti". Dymock & al. (1893) report that "The berries [really drupes!] are imported into India and are considered to be astringent, resolvent, and deobstruent, and useful for removing obstructions of the brain and liver; they are also given for enlargement of the spleen and dropsy...The seed.. has been found to contain a peculiar bitter principle called Castine, a volatile acrid substance, a large quantity of free acid and fat oil. In Greece the fresh and rather unripe berries are said to be added to the must of the grape to render the wine more intoxicating, and prevent it from turning sour."

Lonicer's herbal (1679) summarizes the uses of *Vitex agnus-castus* in his day as follows: "Die Natur der Schaaffmülle ist zu erwärmen und zusammen zu ziehen....Der Same genützt / benimmt die

Wassersucht ; legt die Unkeuschheit. Ist gut wider giftige Stich und Bisz der Thier. Wer dieser Blätter undersich in sein Bettstatt legt / dem vertreibt es alle Fleischliche Anfechtung. Ist vielleicht desz Strohes / darauf die Barfüsser Münch ligen. Diser Beerlin eins Quintlins schwer mit Wein getruncken / zuvor gestossen / treibet den Weibern ihre Krankheit / zertheilt die Winde im Leib / und löschet die Begierde der Ehelichen Wercke ausz. Für giftiger Thier Bisz soll man diese Frucht gebrauchen/ Deszgleichen die Weiber / so übel säugen / dann es mehret ihnen die Milch/ Es bekompt auch wol denen Miltz- und Lebersüchtigen / so sich vor der Wassersucht besorgen. Zu viel gebraucht / schwächet es das Haupf und macht schlaffen. Das Laub zertnirscht / den Safft heraus getruckt / damit gesalbet / heilst die Spinnenstich. Das Laub in Wein gesotten / mit Honig vermisch / und den Mund damit gewaschen / heilet Mund- und Zahngeschwär. Mit Wasser gesotten / und damit gewaschen / heilet es alle Risz und Schrunnen am Hindern / sonderlich den Weibern / so etwas an heimlichen Orten entzündet werden / denen soll man ein Fomentum oder Bähung ausz dem Laub machen / und sie darüber setzen. Es schreibt Dioscorides / dasz / wer dieses Baums Zweige in der Hand habe / der sei sicher vor den Wölffen." Emberger (1938) notes only the one supposed use: "Les fruits remplacent le Poivre et ont la réputation d'être antiaphrodisiaques. Pour cette raison le Gattilier était pour les Anciens le symbole de la pureté". Spach (1840) says: "Les feuilles ont une odeur désagréable. La fruit, auquel les anciens attribuaient, sans trop de raisons, des vertus anti-aphrodisiaques, a une saveur âcre et aromatique, analogue à celle du poivre: ce fruit s'emploie en guise d'épices, dans des contrées où le Gattilier abonde."

Burlage (1968) asserts, erroneously, that *V. agnus-castus* is a "Native of China and India". He asserts also that the seeds are "reported to be sedative and a perfume is made from the flowers". Perrot & Paris (1971) repeat that "La plante est très anciennement réputée comme anaphrodisiaque, d'où son nom. l'infusé est sédatif et antispasmodique....La plante renferme une huile essentielle, un glucoside chromogénique, l'agnoside, et des pigments flavoniques". Lázaro (1921) repeats that "Los frutos se usaron como antiafrodís-iacos". Bouchhez (1843) says that the plant "s'en servent pour lier les mains de leurs morts". Parsa (1949) reports that "le bain de feuilles bouillies dans l'eau est employé pour guérir les enfants qui ont attrapé froid"; also "employé contre les maladies du l'oeil et les coliques" and "les graines sont données aux chevaux contre la colique une noire. Un tissu bouillie avec ses feuilles prend une teinte noire."

Bush-Brown (1963) points out that *V. agnus-castus* tolerates sandy soil, dry places, and city conditions. The Nehrlings (1968) affirm that it is fairly drought-resistant, more rugged than appearances would indicate, surviving heat and poor or dry soils in the bright sun, and is actually better performing under such conditions than most cultivated shrubs. The stems winterkill, but the roots send up new shoots that flower in the same year -- it is

best to cut the plant back to stubs each year.

Gomma & al. (1978) found in the leaves and fruits five flavonoids (casticin, isovitexin, isovitexin xyloside, orientin, and isoorientin) and two iridoids (aucubin and agnoside). In preliminary tests these compounds showed a marked inhibitory activity against 3 bacterial pathogens. Fernandez (1947) found rubber in the roots. Schimmel (1908) found cineol, sabinene, and a quinone in the volatile oil from the leaves and this volatile oil was also analyzed by Hänsel (1910). Gibbs (1974) reports leucocyanin absent from the leaves, the HCl/methanol test negative, and negative results with the juglone test in the leaves, bark, and wood, but "a blue fluorescence" results. Kariyone (1965) found that the so-called "vitexin" from the seeds of *Vitex agnus-castus* differs from the "vitexin" obtained from *V. lucens* and so he proposes the former henceforth be known as "casticin", it being 5,3'-dihydroxyl-3,6,7,4'-tetramethoxyflavone. He also isolated agnuside from the leaves (1964) which he says is "probably the p-hydroxbenzoic ester of aucubin" (1962). Katuzhanskaya (1977) describes the composition of the organic acids isolated from CO₂-extracts of *V. agnus-castus* fruit. Belic & al. (1961) also isolated casticin from Yugoslavian material of this species. Cole & al. (1968) sprayed plants of this species with Dow latex 12-R, a styrene-butadiene latex, in two concentrations, the control plants sprayed with water. After one year the plants sprayed with the chemical in lower concentration had made significantly more growth than the controls; those sprayed with the higher concentration did not significantly increase growth, possibly owing to a slight phytotoxicity.

Alexopoulos (1940) records the fungus, *Phoma viticis* Celotti, on the leaves of *V. agnus-castus*, Voronov (1922) records *Leptosphaeria casta* Voronov from the dry twigs, and Thornberry (1966) lists *Cercospora viticis* Ell. & Ev. (a leaf-spot) and *Phymatotrichum omnivorum* (Shear) Dug. (a root-rot) from Louisiana, Texas, and Oklahoma. Kobayashi (1970) found that *Valsa ceratosperma* (Tode) Maire makes black pustules on the bark of cankered or dead stems and branches of this host in Japan. Mound & Halsey (1978) assert that it is host to the whitefly, *Bemisia tabaci* (Gennadius) Takahashi in Egypt; this based on a report by Azab & al. (1970).

Guinet & Sauvage (1954) cite *Becibissa* 409 and *Lejouad* 497 from Morocco; Maheshwari (1963) cites his no. 220 from Delhi, India; Patzak & Rechingner (1967) cite *Sinten* 645 from Iran; and Jafri & Ghafoor, in a personal communication to me, cite *Abedin* 7403 from cultivation in Pakistan.

It is perhaps worth noting that the Blackwell polynomial cited by Gmelin (1796) seems definitely to belong to the synonymy of *V. agnus-castus* var. *diversifolia* (Carr.) Schelle, but the illustration given by Blackwell (1751) shows leaflets that are plainly and completely entire and therefore illustrate the typical form of *V. agnus-castus* L.

Material of *V. agnus-castus* has been misidentified and distributed in some herbaria as *V. macrophylla* Hort., *V. negundo* L.,

V. pseudonegundo Hand.-Mazz., and *V. rehmannii* Gürke. On the other hand, the *Fogg s.n.* [July 18, 1969], distributed as typical *V. agnus-castus*, actually represents *f. latifolia* (Mill.) Rehd., *Griffith 6059* and *Zohary, Amdursky, & Grizi s.n.* [14.11.1951] are var. *pseudo-negundo* Hausskn., *Pratt s.n.* [October 7, 1964] is *V. negundo* L., *N. Chevalier 12* is *V. negundo* var. *intermedia* (P'ei) Mold., and *Stefani s.n.* [10 mai 1903] is not verbenaceous. *Jerabek s.n.* [June 1945], cited below, is a mixture with *Petrea volubilis f. pubescens* (Mold.) Mold. and *Herb. Missouri Bot. Gard. 116201* is a mixture with something non-verbenaceous (probably *Aleurites moluccanum*). The illustration in Viertel (1970) is labeled as depicting *V. agnus-castus*, but shows all the leaflets plainly sessile.

Additional citations: NORTH CAROLINA: Rockingham Co.: *Leonard & Russ 2562* (Au--284927, Bl--251048, , Ld, N, Tu--179458, Ws). ARKANSAS: Nevada Co.: *D. M. Moore 420469* (Ws). LOUISIANA: East Baton Rouge Par.: *Taylor s.n.* [May 18, 1899] (Lv). Tangipahoa Par.: *H. R. Wilson 232* (Lv). OKLAHOMA: Payne Co.: *Harn 56* (Au--122932). TEXAS: Bastrop Co.: *Duval 134* (Au--291212). Brown Co.: *McKnight 16* (Au--244321, Ld). Tarrant Co.: *A. Ruth 993* (Ws). Travis Co.: *Correll & Correll 34288* (Ld); *Harpin, Waldorf. & Barkley 13081* (Bl--53477). OREGON: Benton Co.: *W. M. Smith s.n.* [VIII/9/1959] (Se--197037). MEXICO: Nuevo León: *Etchison 55* (Au--297432). FRANCE: *Boulos s.n.* [17.5.1961] (Gz); *Lamaroux s.n.* [Provence] (T). SPAIN: *Sennen 36008* (Ws). AUSTRIA: *Noë s.n.* (Pd). GREECE: *Kuntze s.n.* [Cyclopi, 16/6/67] (W--2506585); *Nitzelius s.n.* [Litochoron, 8/10/1963] (Go); *Saint-Lager 3* (Ba); *Zuccarini s.n.* (T). AEGEAN ISLANDS: Chios: *Lüttke 595* (Mu), 596 (Mu). Kos: *Sauer & Sauer 13894* (Mu). ITALY: *Robertson s.n.* [Scala di Salonse, 1829] (T); *Tenore s.n.* [1840] (Mu--614). CYP-RUS: *Casey 1632* (Ba). CORSICA: *Aellen 1856* (Ws). YUGOSLAVIA: Dalmatia: *Servola s.n.* (Mu--615). Fiume: *Noë 329* [Reichenb. Fl. Germ. 2289] (N). Illyria: *Tommasini s.n.* [Monpalcone] (Ba). Istria: *Untchj s.n.* [Pola, 8-9-88] (Mi), *s.n.* [2.8.1899] (Gz). RUSSIA: Transcaspia: *Michelson 87* (Mu). MOROCCO: *D. Fairchild 74* (W--1349467), 82 (W--1349471); *Garnett 38/7* (Mu). EGYPT: *G. Maire 141* (Gz); *Romee s.n.* [18.3.1968] (Gz). SOUTH AFRICA: Cape Province: *Bayliss BS.5095* (W--2670629), *BS.7270* (Mu). TURKEY: *Manissadjian 290* (Mu), 326 (Mu); *Stutz 453* (N). AFGHANISTAN: *W. Griffith 6059* (Mu--1342). INDIA: State undetermined: *Herb. Schreber s.n.* [India orientalis] (Mu--603). CULTIVATED: Alabama: *Justice 525* (Ba). Arizona: *Simonian 361* (Tu--172595); *Thornber s.n.* [June 13, 1903] (Au). California: *Jerabek s.n.* [November 1944] (Sd--34534), *s.n.* [June 1945] (Sd--36463); *McClintock s.n.* [July 14, 1943] (Ba); *Moran 2458* (Ba); *Witham 304* (Sd--71836). Egypt: *Boulos & Tanadros s.n.* [Dokki] (Gz); *Hassib s.n.* [22/12/1927] (Gz); *Mahdi 34* (Gz), 146 (Gz), *s.n.* [4.8.63] (Gz, Gz), *s.n.* [18.8.63] (Gz, Gz), *s.n.* [10/11/63] (Gz, Gz), *s.n.* [9/6/65] (Gz, Gz, Gz), *s.n.* [23.5.65] (Gz, Gz, Gz), *s.n.* [18/8/68] (Gz, Gz, Gz), *s.n.* [3/6/70] (Gz, Gz, Gz), *s.n.* [10/12/72] (Gz, Gz, Gz); *Runke-witz s.n.* [18/11/1933] (Gz); *Sisi s.n.* [22/5/1973] (Gz, Gz); *V.*

Täckholm s.n. [28/10/1959] (Gz, Gz); *Täckholm & Elsayed* 269 (Gz), 337 (Gz), *s.n.* [8/1/1961] (Gz, Gz), *s.n.* [28/11/1961] (Gz), *s.n.* [17/5/1962] (Gz, Gz, Gz), *s.n.* [24/5/1962] (Gz, Gz). Florida: *Gillis* 8449 (Ac, Ba, Ft, Ft), *Meebold* 27509 (Mu); *P. O. Schallert* 365 (Bl--208625). Germany: *Herb. Schreber s.n.* (Mu--674). Kentucky: *Denniston s.n.* [June 24, 1929] (Ws). Louisiana: *Boyd s.n.* [June 3rd 1898] (Lv); *Joor s.n.* [Baton Rouge] (W--2607108); *Pecoy s.n.* [May 19, 1899] (Lv); *Pratt s.n.* [May 20, 1899] (Lv). Mexico: *Imboden* 74 (Au--297434). New Zealand: *Sykes* 16/68 [Herb. Bot. Div. DSIR 173231] (Ld), 630/65 [Herb. Bot. Div. DSIR 157634] (Ac). North Carolina: *Biltmore Herb.* 1786 [Sept. 27, 1897] (Ws); *LeClair s.n.* [June 26, 1937] (N); *D. Pratt s.n.* [10/17/64] (Lv); *P. O. Schallert s.n.* [7/10/31] (Ws). Pakistan: *Abedin* 7403 (Kh, Ld). Poland: *Baenitz s.n.* [Silesia, 15.9.1910] (Gz, Gz). South Africa: *Bayliss* BS.4542 (Ba, N, W--2616806), BS.6236 (Mu, N, W--2744925). South Carolina: *Rodgers & Mullens* 67086 (Bl--215442, N, Se--234702). Texas: *Hansen, Hansen, & Nee* 1811 (Ws); *Purvis* 8 (Au--248392); *R. Runyon* 4258 (Au--269633, Au--269643, Au--269673), 5445 (Au--270204), 124761 (Au--269536); *Saichuk* 73 (Lv); *Shinners* 8582 (Ba). Virginia: *Allard* 11391 (Se--134451). LOCALITY OF COLLECTION UNDETERMINED: *Happe s.n.* [in Europa australi] (Mu--607); *Herb. Missouri Bot. Gard.* 116201 (E).

VITEX AGNUS-CASTUS f. *ALBA* (West.) Rehd.

Additional & emended synonymy: *Agnus castus*, *flore albo* Cup., Hort. Cath. 4. 1696. *Vitex agnus castus albidus* Desf., Tabl. Écol. Bot., ed. 1, 53. 1804. *Vitex agnus-castus albidus* Desf., Tabl. Écol. Bot., ed. 2, 64. 1815. *Vitex agnus-castus* b. *flore albo* Gussone, Fl. Sic. Prodr. 2: 147, in syn. 1828. *Vitex agnus-castus* var. *alba* Rehd. ex C. K. Schneid., Illustr. Handb. Laubholz. 2: 594. 1911. *Vitex agnus-castus* cv. "Alba" Enari, Ornament. Shrubs Calif. 170. 1962. *Vitex albiflora* Hort. ex Turrill, Curtis Bot. Mag. 174: pl. 400, in syn. 1962.

Additional bibliography: Cast., Hort. Mess. 24. 1640; Cup., Hort. Cath. 4. 1696; Cup., Hort. Cath. Suppl. Alt. 6. 1697; Desf., Tabl. Écol. Bot., ed. 1, 53 (1804) and ed. 2, 64. 1815; Gussone, Fl. Sic. Prodr. 2: 147--148. 1828; Voss in Vilm., Blumengärt. 1: 829. 1895; Baerecke, Anal. Key Ferns Flow. Pl. Atl. Sect. Middl. Fla. 115. 1906; C. K. Schneid., Illustr. Handb. Laubholz. 2: 594. 1911; Sommer & Caruana Gatto, Fl. Melit. Nov. 234. 1915; Makins, Ident. Trees Shrubs 259. 1936; W. Trelease, Pl. Mat. Decorat. Gard. Woody Pl., ed. 5, imp. 1, 146. 1940; E. L. D. Seymour, New Gard. Encycl., ed. 3, 1292 (1944), ed. 4, 1292 (1946), and ed. 5, 1292. 1951; Blackburn, Trees Shrubs East. N. Am. 302. 1952; Bean in Chittenden, Dict. Gard. 2249. 1956; Wyman, Shrubs Vines Am. Gard. 351 & 352. 1956; Hatton, Hand. Pl. Flor. Orn. 368, fig. 727. 1960; Enari, Ornament. Shrubs Calif. 170. 1962; Turrill, Curtis Bot. Mag. 174: pl. 400. 1962; E. L. D. Seymour, New Gard. Encycl., ed. 6, 1292 (1963) and ed. 7, 1292. 1964; Everett, Reader's Digest Compl. Book Gard. 447. 1966; Mold., Phytologia 16: 494. 1968; A. & I. Nehrling, Easy Gard. Drought-Resist. Pl., imp. 1, 226. 1968; W.

Trelease, Pl. Mat. Decorat. Gard. Woody Pl., ed. 5, imp. 2, 146. 1968; Mold. in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. 6:] 1340 & 1878. 1970; E. L. D. Seymour, New Gard. Encycl., ed. 8, 1292. 1970; Mold., Fifth Summ. 1: 31, 61, 205--207, 266, 373, 385, & 386 (1971) and 2: 710--713, 717, & 922. 1971; Priszter, Delect. Sem. Spor. Pl. Hort. Bot. Univ. Hung. 59. 1971; Wyman, Gard. Encycl., imp. 1, 1171 (1971) and imp. 2, 1171. 1972; Fletcher in Hillier, Man. Trees Shrubs, ed. 2 & imp. ed 2, 416. 1972; Mold., Phytologia 23: 419 & 427 (1972) and 25: 244. 1973; Williamson, Sunset Gard. Book, ed. 3, imp. 11, 440. 1973; A. & I. Nehrling, Easy Gard. Drought-Resist. Pl., imp. 2, 226. 1975; L. H. & E. Z. Bailey, Hortus Third 1162. 1976; D. E. Clark, Sunset New West. Gard. Book, ed. 4, imp. 2, 498. 1979; Jones & Luchsinger, Pl. Systemat. 302. 1979.

Gussone (1828) reports this color form of the species from Sicily. Desfontaines (1804) calls it the "*vitex agnus castus* à fleurs blanches" and "*vitex agnus-castus blanc*" (1815). Priszter (1971) lists it as cultivated in Hungary, offering seeds in exchange as his seed no. 1673. Cornman's collection, cited below, cultivated in Massachusetts, was grown from seed secured in New Jersey. The form has been collected in anthesis in September.

Additional citations: CULTIVATED: Massachusetts: *Cornman A.A.* 976-34-B (Ba). New Jersey: *A. L. Moldenke s.n.* [Plainfield, Sept. 7, 1968] (Ps--367), *s.n.* [Plainfield, Sept. 1, 1972] (Ps--1438).

VITEX AGNUS-CASTUS f. *CAERULEA* (Rehd.) Mold., Phytologia 44:135. 1979.

Additional synonymy: *Vitex agnus-castus* var. *caerulea* Rehd. ex C. K. Schneid., Illustr. Handb. Laubholz. 2: 594. 1911. *Vitex agnus-castus caerulea* Trelease, Pl. Mat. Decorat. Gard. Woody Pl., ed. 5, imp. 1, 146. 1940. *Vitex agnus-castus caerulea* [Rehd.] ex Correll & Johnston, Man. Vasc. Pl. Tex. 1878. 1970. *Vitex agnus-castus caerulea* Rehd. ex Mold., Fifth Summ. 2: 712, in syn. 1971.

Additional bibliography: Voss in Vilm., Blumengärt. 1: 829. 1895; Battan. & Trabut., Fl. An al. Synop. Alg. 271. 1902; Baer-ecke, Anal. Key Ferns Flow. Pl. Atl. Sect. Middl. Fla. 115. 1906; W. Trelease, Pl. Mat. Decorat. Gard. Woody Pl., ed. 5, imp. 1, 146. 1940; Hatton, Handb. Pl. Flor. Orn. 368, fig. 727. 1960; Burlage, Ind. Pl. Tex. 184. 1968; Mold., Phytologia 16: 492 & 494. 1968; W. Trelease, Pl. Mat. Decorat. Gard. Woody Pl., ed. 5, imp. 2, 146. 1968; G. W. Thomas, Tex. Pl. Ecolog. Summ. 78. 1969; Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. 6:] 1878. 1970; Mold. in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. 6:] 1340. 1970; Mold., Fifth Summ. 1: 50, 61, 190, 206, 207, & 373 (1971) and 2: 709--712, 717, & 922. 1971; Mold., Phytologia 34: 250 (1976) and 44: 134. 1979.

The corollas are uniformly described as "blue" in this form, as opposed to the "purple", "purplish", or "lavender" of the typical form. It has been collected in flower and fruit in July. The flowers are described as being "pleasantly scented".

Additional citations: LOUISIANA: Catahoula Par.: C. Allen 2167 (Lv). CULTIVATED: Louisiana: DeWolf 915 (Ba). North Carolina: P. O. Schallert 351 (Se--112297, Se--113560), s.n. [7/25/40] (Ws).

VITEX AGNUS-CASTUS var. *DIVERSIFOLIA* (Carr.) Schelle

Additional synonymy: *Vitex foliis digitatis serratis spicis verticillatis* Blackwell apud Gmel. in L., Syst. Nat., ed. 13, 2: 963. 1796. *Vitex agnus castus* var. *diversifolia* Schelle ex C. K. Schneid., Illustr. Handb. Laubholzk. 2: 594. 1911. *Vitex foliis digitatis serratis spicis verticillatis* L. apud Zangheri, Fl. Veg. Pinet. Raven. 189, in syn. 1936. *Vitex lat. serrat. folio* Gerarde, Herbal, ed. 3, [45]. 1975.

Additional bibliography: Blackwell, Cur. Herb. 1: pl. 139. 1751; Gmel. in L., Syst. Nat., ed. 13, 2: 963. 1796; C. K. Schneid., Illustr. Handb. Laubholzk. 2: 594. 1911; Zangheri, Fl. Veg. Pinet. Raven. 189. 1936; Mold., Phytologia 16: 494. 1968; Mold., Fifth Summ. 1: 373, 385, & 386 (1971) and 2: 710, 712, 720, & 922. 1971; Mold., Phytologia 28: 452. 1974; Gerarde, Herbal, ed. 3, [45] & 1387. 1975; Mold., Phytologia 34: 270. 1976.

Illustrations: Gerarde, Herbal, ed. 3, 1387. 1975.

Linnaeus (1796) plainly accredits the polynomial cited above to "Blackwell herb. t. 139". The reference is sometimes mis-cited as occurring on "p. 1122". The Blackwell illustration (1751), however, is of the typical form of the species, the leaflets being plainly and completely entire-margined.

The Woodbury collection, cited below, was probably taken from cultivated material, although the label accompanying it does not so indicate.

Additional citations: CULTIVATED: Egypt: Hassib s.n. [22/12/1927] (Gz, Gz). Florida: Woodbury s.n. [Coconut Grove, July 20, 1948] (Ws). Missouri: Piehl s.n. [19 Oct. 1968] (Ws).

VITEX AGNUS-CASTUS f. *LACINIOSA* (Ces.) Mold., stat. nov.

Synonymy: *Vitex agnus castus* β *laciniosa* Ces. in Ces., Passer., & Gib., Comp. Fl. Ital. 327. 1874. *Vitex laciniosa* Arcang., Compl. Fl. Ital., ed. 1, 886. 1882 [not *V. laciniosa* Turcz., 1863].

Vitex agnus-castus var. *laciniosa* Ces. ex Mold., Phytologia 23: 419. 1972.

Bibliography: Ces., Passer., & Gib., Comp. Fl. Ital. 327. 1874; Arcang., Compl. Fl. Ital., ed. 1, 561 & 886 (1882) and ed. 2, 444 & 833. 1894; Mold., Phytologia 23: 419, 437, & 438. 1972.

The original description of this variety is merely "Foglioline laciniata. Qua e là colla specie". I have not seen any original material, so it is entirely possible that his taxon may be identical with var. *diversifolia* (Carr.) Schelle.

VITEX AGNUS-CASTUS f. *LATIFOLIA* (Mill.) Rehd.

Additional synonymy: *Vitex agnus-castus* β *latifolia* Sweet, Hort. Brit., ed. 1, 323. 1826. *Vitex agnus castus* 2. *latifolia* G. Don in Loud., Hort. Brit., ed. 1, 246. 1830. *Vitex agnus-castus* f. *macrophylla* Hatton, Craftsm. Pl.-book 368, fig. 728. 1909. *Vitex agnus-castus* var. *latifolia* (Mill.) Loud. ex Turrill, Curtis Bot.

Mag. 174: pl. 400. 1962. *Vitex agnus-castus latifolia* (Mill.) Loud. ex Enari, Ornament. Shrubs Calif. 170, in syn. 1962. *Vitex agnus-castus* cv. "Latifolia" Enari, Ornament. Shrubs Calif. 170. 1962. *Vitex agnus castus latifolia* Nehrling, Easy Gard. Drought-Resist. Pl. 225, in syn. 1968. *Vitex agnus-castus* "Latifolia" McGourty, Plants Gard. 26 (2): 53. 1970. *Vitex albida* Lam., in herb.

Additional bibliography: Pers., Sp. Pl. 3: 361. 1819; Sweet, Hort. Brit., ed. 1, 1: 323. 1826; G. Don in Loud., Hort. Brit., ed. 1, 246. 1830; Sweet, Hort. Brit., ed. 2, 416. 1830; Loud., Hort. Brit., ed. 2, 551. 1832; Loud., Arb. Fruct. Brit. 3: 1286. 1838; Sweet, Hort. Brit., ed. 3, 551. 1839; Buek, Gen. Spec. Syn. Candoll. 3: 502. 1858; Tornabene, Fl. Aetnea 3: 175 (1891) and 4: 486. 1892; Hatton, Craftsm. Pl.-book 368, fig. 728. 1909; C. K. Schneid., Illustr. Handb. Laubholz. 2: 594. 1911; E. L. D. Seymour, New Gard. Encycl., ed. 3, 1292 (1944), ed. 4, 1292 (1946), and ed. 5, 1292. 1951; Blackburn, Trees Shrubs East. N. Am. 302 & 356. 1952; Hatton, Handb. Pl. Flor. Orn. 368, fig. 728. 1960; Enari, Ornament. Shrubs Calif. 170. 1962; Turrill, Curtis Bot. Mag. 174: pl. 400. 1962; E. L. D. Seymour, New Gard. Encycl., ed. 6, 1292 (1963) and ed. 7, 1292. 1964; Wayside Gardens, For Autumn Plant. 115 & 117. 1964; Everett, Reader's Digest Compl. Book Gard. 447. 1966; E. Lawrence, South. Gard., ed. 2, 219. 1967; Mold., Phytologia 16: 494. 1968; Mold., Résumé Suppl. 17: 8. 1968; A. & I. Nehrling, Easy Gard. Drought-Resist. Pl., imp. 1, 226. 1968; Spring Hill Nurseries (Tipp City, Ohio), Fall Sale Cat. 23. 1968; McGourty, 1200 Trees [Plants Gard. 26 (2):] 53. 1970; E. L. D. Seymour, New Gard. Encycl., ed. 8, 1292. 1970; Mold., Fifth Summ. 1: 25, 27, 50, 205--208, 266, 267, 373, 376, 385, & 386 (1971) and 2: 710--713, 720, 721, 723, 724, 731, 784, & 922. 1971; Anon., U. S. Dept. Agr. Home Gard. Bull. 181: 3 & 20. 1972; Fletcher in Hillier, Man. Trees Shrubs, ed. 2, 416 (1972) and imp. ed., 416. 1972; Mold., Phytologia 23: 437. 1972; Skinner, Ornament. Pl. Coastal Northw. 76. 1972; Williamson, Sunset Gard. Book, ed. 3, imp. 11, 440. 1973; Whitney in Foley, Herbs Use Delight [204]. 1974; Mold., Phytologia 31: 392. 1975; A. & I. Nehrling, Easy Gard. Drought-Resist. Pl., imp. 2, 226. 1975; Wyman, Gard. Journ. 25: [45] & 46. 1975; L. H. & E. Z. Bailey, Hortus Third 1162. 1976; Mold., Phytologia 34: 270. 1976; D. E. Clark, Sunset New West. Gard. Book, ed. 4, imp. 2, 498. 1979.

Additional illustrations: Hatton, Craftsm. Pl.-book 368, fig. 728. 1909; Hatton, Pl. Flor. Orn. 368, fig. 728. 1960; Spring Hill Nurseries (Tipp City, Ohio), Fall Sale Cat. 23 [in color]. 1968; McGourty, 1200 Trees [Plants Gard. 26 (2):] 53. 1970; Wyman, Gard. Journ. 25: [45]. 1975.

Recent collectors describe this plant as a tomentose shrub, to 6 feet tall, with a strong aromatic odor, and numerous annual stems from a perennial base, flowering in June and August, fruiting in October. The corollas are said to have been "light-lavender" on *DeWolf & Gruns 2152* and "lilac" on *Fogg s.n.*, while Pancho says "corolla-lobes RHS [Royal Horticultural Society, London] Wisteria

Blue 640". Lawrence (1967) reports that in the southern United States this form of the species starts blooming between June 6 and 21 and ends its period of anthesis in July. Common names recorded for it are "broadleaf chaste-tree" and "broad-leaved chaste-tree". The Spring Hill Nursery (1968) describes it as a "Distinctive hardy 4 ft. shrub with star-like foliage and magnificent large, deep, lavender spire-like blooms in July and August. Delightful change of pace for the foundation". They offer it at \$2.50 for a 2-foot plant or \$1.65 for a 1--1 1/2-foot plant. The Nehrlings (1975) assert that it is somewhat hardier than the typical form and is propagated chiefly by cuttings. They claim that *V. agnus-castus* var. *macrophylla* has still larger leaves and still deeper-colored corollas, but, lacking more definite evidence, I am regarding the latter as identical to the wild broad-leafleted form. Hatton (1960) claims that the form with broad leaflets, like the typical narrow-leafleted form, has had its seeds considered anti-aphrodisiac since ancient times. This is probably true, since, contrary to claims in horticultural literature that it is a cultivar ("cv."), it is wild and surely native throughout Mediterranean Europe and is even known in fossil form there.

Vitex albidia appears to be based on an unnumbered Schultes collection from cultivated material in Germany and deposited in the Munich herbarium. The specific epithet chosen implies that the corollas were whitish, but there is no evidence of this on the preserved specimen or its label.

Material of *f. latifolia* has often been misidentified and distributed as typical *V. agnus-castus* L. On the other hand, the *Jerabek s.n.* [November 1944], distributed as this form, actually does represent, instead, typical *V. agnus-castus* L.

Additional citations: CULTIVATED: Germany: *Schultes s.n.* (Mu--1343). Massachusetts: *DeWolf & Bruns 2152* [Arnold Arb. 453-51-A] (Ba). Missouri: *Piehl s.n.* [19 Oct. 1968] (Ws). New Jersey: *Moldenke & Moldenke 29213* (Ld). New York: *E. C. Baldwin s.n.* [Aug. 15, 1944] (Ba). New Zealand: *Syles 16/66* [Herb. Bot. Div. DSIR 173231] (Ld). Oklahoma: *L. C. Anderson 2390* (Ws). Pennsylvania: *Fogg s.n.* [July 18, 1969] (Ba); *J. V. Pancho 200* (Ba). South Carolina: *Rodgers & Mullens 67086* (Au--259510, Ld, Ws). MOUNTED ILLUSTRATIONS: Kelly *Ornamentals* fig. 45 [in color] (Z); *Wayside Gardens* fig. 184 [in color] (Z); *Wayside Gardens, For Autumn Planting* 117 [in color] (Z).

VITEX AGNUS-CASTUS var. *PSEUDO-NEGUNDO* Hausskn.

Additional synonymy: *Vitex agnus castus* var. *pseudo-negundo* Hausskn. in *Bornm., Beih. Bot. Centralbl.* 22 (2) [Pl. Strauss. 3]: 117. 1907. *Vitex agnus-castus* ssp. *haussknechtii* var. *pseudo-negundo* (Hausskn.) *Bornm. ex Parsa, Fl. Iran* 4 (1): 540. 1949. *Vitex pseudonegundo* *Hand.-Mazz. ex Parsa, Fl. Iran* 4 (1): 540, in syn. 1949. *Vitex agnus* var. *pseud.* Hausskn. *ex Parsa, Fl. Iran* 4 (1): 540, in syn. 1949. *Vitex hybrida* *Mold., Résumé* 384, in syn. 1959. *Vitex? hybrida* *Mold. apud R. R. Stewart,*

Annot. Cat. in Nasir & Ali, Fl. W. Pakist. 608, in syn. 1972. *Vitex angus-castus* var. *pseudo-negundo* (Hausskn.) Hand.-Mazz., in herb.

Additional & emended bibliography: Hand.-Mazz., Ann. Hofmus. Wien 27: 408, pl. 19, fig. 1. 1913; Fedde & Schust., Justs Bot. Jahresber. 43: 159. 1922; Parsa, Fl. Iran 4 (1): 540. 1949; Al-Rawi, Iraq Min. Agr. Tech. Bull. 14: 149. 1964; Guest & Al-Rawi, Fl. Iraq 1: 84 & 106. 1966; Kandelaki, Vestn. Gruzinsk. Bot. Obšč. 3: 79--87. 1966; Patzak & Rech., Fl. Iran 43: 5--6 & 8. 1967; Brummitt & Ferguson, Reg. Veg. 61: 190. 1969; Mold., Phytologia 16: 493 & 494 (1968) and 17: 16. 1968; Daoud & Skeikh, Bull. Coll. Sci. Univ. Baghdad 11 (2): 24--44. 1970; El-Gazzar & Wats., New Phytol. 69: 483 & 485. 1970; Anon., Biol. Abstr. 52 (5): B.A.S.I. C. S.238 & S.240. 1971; Löve, Taxon 20: 353. 1971; Mold., Fifth Summ. 1: 208, 266, 267, & 269 (1971) and 2: 712, 719, 723, 726, & 922. 1971; "N. F. G.", Biol. Abstr. 52: 2515. 1971; Rouleau, Taxon Index Vols. 1-20 part 1: 382. 1972; R. R. Stewart, Annot. Cat. in Nasir & Ali, Fl. W. Pakist. 608. 1972; Townsend, Kew Bull. 27: 148 & 149, fig. 1 (center). 1972; Anon., Biol. Abstr. 56 (4): B.A.S.I.C. S.280. 1973; "H. R.", Biol. Abstr. 56: 1847. 1973; Mold., Phytologia 25: 244 & 245 (1973) and 28: 441, 443, & 452. 1974; El-Gazzar, Egypt. Journ. Bot. 17: 75 & 78. 1974; [Farnsworth], Pharmacog. Titles 7, Cum. Gen. Ind. [118]. 1975; Koiiman, Act. Bot. Néerl. 24: 462. 1975; S. & D. Talalaj, Bull. Biol. Res. Cent. Baghdad 7: 32--42. 1976; S. & D. Talalaj, Biol. Abstr. 65: 4710. 1978.

Illustrations: Hand.-Mazz., Ann. Hofmus. Wien 27: pl. 19, fig. 1. 1913; Townsend, Kew Bull. 27: 148, fig. 1 (center). 1972.

Recent collectors describe this plant as a bush or shrub, 1--4 m. tall, and have found it growing along roadsides, on riverbanks and streamsides, in gravelly sandy-clay or rocky sandy-clay loam, in dry forests and desert washes, in dry depressions and low bushy woods, and in the gravel of wadi beds, at altitudes of 11--2300 meters, flowering from May to November, fruiting in March, August, September, and November. Guest & Al-Rawi (1966) assert that it is very abundant (10--20 percent) in the *Asphodeletum aestivi* ecologic association on gently sloping hillsides and also is common among arborescent species along the sides of mountain streams in the forest zone associated with *Paliurus spina-christi* and *Nerium oleander*.

The chromosome number is reported by Löve (1971) as $2n = 32$, Based on *Murin & Sheikh s.n.* from Iraq. The Talalajs (1978) report isolating a volatile oil of possible economic importance from the plant. The corollas are said to have been "blue" on *Andersen & Petersen 443* and *Qaiser & Ghafoor 1525*, "violet" on *Ali 1074* and *Qaiser 209*, "lavender" on *Long 417*, "purple" on *Ali & al. 1957*, and "purple with the throat white" on *Koelz 13223*.

Stewart (1972) quotes Parker to the effect that this plant is cultivated in gardens on the plains of Pakistan and is best recognized by its "cylindric panicles of bright violet" flowers. The leaflets on *Rechinger 10714* are extra large, greatly resembling

those of *V. negundo* L.

Patzak & Rechinger (1967) distinguish this taxon from its close relatives in the area which it naturally occupies as follows:

Flores plerumque in inflorescentias simplices vel paniculatas dispositae; cymae sessiles vel subsessiles; folia plerumque 5--7-na.

Labium inferius corollae intus non barbatum....*V. agnus-castus*.

Labium inferius corollae intus barbatum.....

V. agnus-castus var. *pseudo-negundo*.

Flores plerumque laxae paniculatae; cymae manifeste stipitatae;

foliola plerumque 3--5-na.....*V. negundo*.

Jafri & Ghafoor, in a personal communication to me, separate them similarly:

Leaflets 3--5; cymes often somewhat lax and panicked, forming a pyramidal inflorescence; flowers not fragrant....*V. negundo*.

Leaflets 5--7; cymes sessile or subsessile, forming a subcylindrical narrow inflorescence; flowers fragrant.

Lower corolla-lobes glabrous or slightly pubescent at the base only.....*V. agnus-castus*.

Lower corolla-lobes densely ciliate or pubescent.....

V. agnus-castus var. *pseudo-negundo*.

Townsend (1972) separates them thus:

Lower lip of corolla glabrous, or with a few sparse hairs at the basal angles only.....*V. agnus-castus*.

Lower lip of corolla bearded with a semicircular line of hairs at the base

Inflorescence with the lateral cymes more congested; inner surface of calyx with the intermediate veins more or less zigzag above or tending to merge into the reticulate secondary venation extending from the middle of the tube upwards; petiolule of central leaflet to 1 cm. long.....

V. agnus-castus var. *pseudo-negundo*.

Inflorescence with the lateral cymes laxer; inner surface of the calyx with the intermediate veins straight and almost reaching the sinuses, the secondary venation at most looping-anastomosing and never reticulate in the tube; petiolule of central leaflet to 2 cm. long.....*V. negundo*.

Handel-Mazzetti (1913) cites *Bornmüller 1536*, *Handel-Mazzetti 1970*, and *Sintenis 1305* from Mesopotamia and lists the variety also from Iran. Jafri & Ghafoor cite *S. I. Ali 1074*, *Azher 32 & D-5*, *Hamid Ali 5 & C-7*, *Nath 2430*, *Qaiser 203 & G-2*, *Qaiser & Ghafoor 1525*, and *Sultanul Abedin 6727* from Pakistan, where, they say, it is called "marwan" and flowers from May to July. They give its overall distribution as southwest Asia eastward to Afghanistan and Pakistan. Stewart (1972) cites, also from Pakistan, *Aitchison 446*, *Harsukh 20615*, *Lace 3619*, *Patzak & Rechinger s.n.*, and *Popov 308*. Patzak & Rechinger (1967) cite the following: IRAQ: *Bornmüller 1536*; *Guest 800*, *865*, & *1953*; *Haley 58*; *Helbaek 1225 & 1786*; *Makki 557*; *Rechinger 9612*, *10714*, & *11246*; *Sutherland 16*; *Thesiger 1202*. IRAN: *Bent & Wr. 503-609*; *Bornmüller 5128*; *Grant 15895*; *Koelz 15444 & 18447*; *Rechinger 1308*, *3996*, *5362*, & *5778*; *Shar 1305E*; *Stapf s.n.*;

Stutz 959. RUSSIA: Turkmanskaya: Litw. 2407. AFGHANISTAN: Gabriel 37/3; Kerst. 265; Koeie 2090; Koelz 13223; Lindb. 1960/931; Rechinger 19268 & 32403; Volk 1320. PAKISTAN: Aitchison 446; Bhola s.n.; Harsukh 20615; Lace 3619; Popov 308; Stewart, Blatt, & Fz. 1435 & s.n. They give the overall distribution as "Asia austro-occidentalis a Turcia et Syria et Kurdistan orientem versus usque ad Afghanistan et Pakistan."

Material of this variety has been widely misidentified as typical *V. agnus-castus* L. or as *V. negundo* L.

Additional citations: EGYPT: Bot. Dept. Herb. s.n. [Kharga Oasis, Feb. 1931] (Gz, Gz). ISRAEL: Amdursky 280 (N); Zohary, Amdursky, & Grizi s.n. [14.11.1951] (Ba). JORDAN: V. Täckholm s.n. [6/8/1962] (Gz), s.n. [July 1962] (Gz, Gz). IRAQ: Agnew & Barkley s.n. [27-5-1962] (N, N); F. A. Barkley 32Ir3356 (N); Barkley & Agnew 3290 (N); Barkley, Wahab, & Oraha 6824 (N); Brahim M. 6119 (N); K. H. Rechinger 10714 (Mu). IRAN: Haltenorth s.n. [27.9.1960] (Mu); K. H. Rechinger 43617 (Mu); Rechinger & Rechinger 5778 (Ba). AFGHANISTAN: Andersen & Petersen 443 (N); Griffith 6059 (Pd); Koelz 13223(W--2193776); L. E. Long 417 (W--2189847); Podlech 16145 (Mu), 16825 (Mu), 17162 (Mu), 18545 (Mu), 18581 (Mu), 19196 (Mu), 19901 (Mu), 21692 (Mu); K. H. Rechinger 19268 (Mu), 32403 (Mu), 37025 (Mu), 37547 (Mu). PAKISTAN: Baluchistan: Abedin & Hussain 6727 (Kh); Qaiser 209 (Kh); Qaiser & Ghafoor 1525 (Kh); K. H. Rechinger 29984 (Mu), 30985 (W--2637734); Rechinger, Rechinger, Aellen, & Esfandiari 3996 (Ba, Mu). Northwest Provinces: Ali 5 (Kh), 1074 (Kh); K. H. Rechinger 19617 (Mu). Sind: Ali, Farrofi, & Abedin 1957 (N). West Punjab: Iman 32 (Kh).

VITEX AGNUS-CASTUS var. *PSEUDO-NEGUNDO* f. *ALBIFLORA* Mold.

Additional bibliography: Mold., Phytologia 15: 87. 1967; Mold., Fifth Summ. 1: 266 (1971) and 2: 922. 1971.

VITEX AGNUS-CASTUS f. *ROSEA* Rehd.

Additional synonymy: *Vitex agnus-castus* var. *rosea* Rehd. apud Turrill, Curtis Bot. Mag. 174: pl. 400. 1962.

Additional bibliography: Voss in Vilm., Blumengärtn. 1: 829. 1895; Blackburn, Trees Shrubs East. N. Am. 302. 1952; Wyman, Shrubs Vines Am. Gard. 351 & 352. 1956; Mold., Phytologia 8: 26--27. 1961; Turrill, Curtis Bot. Mag. 174: pl. 400. 1962; Everett, Reader's Digest Compl. Book Gard. 447. 1966; Mold., Fifth Summ. 1: 207 & 373 (1971) and 2: 712, 721, & 922. 1971; Wyman, Gard. Encycl., imp. 1, 1171 (1971) and imp. 2, 1171. 1972; Mold., Phytologia 23: 437 (1972) and 34: 250. 1976; D. E. Clark, Sunset New West. Gard. Book, ed. 4, imp. 2, 498. 1979.

The corollas on the Brown collection, cited below, are said to have been "pink" when fresh.

Additional citations: LOUISIANA: Winn Par.: C. A. Brown 7920 (Lv).

VITEX AGNUS-CASTUS f. *VARIEGATA* Mold.

Additional synonymy: *Vitex agnus-castus* cv. "Variegata" L. H. &

E. Z. Bailey, Hortus Third 1162. 1976.

Additional bibliography: Mold., Phytologia 16: 495. 1968; Brummitt & Ferguson, Reg. Veg. 61: 190. 1969; Mold., Fifth Summ. 2: 710, 711, 922, & 970. 1971; L. H. & E. Z. Bailey, Hortus Third 1162. 1976.

VITEX AJUGAEFLORA Dop

Additional bibliography: Wangerin, Justs Bot. Jahresber. 56 (1): 668. 1936; Fedde & Schust., Justs Bot. Jahresber. 56 (2): 286. 1937; Mold., Phytologia 16: 495. 1968; Mold., Fifth Summ. 1: 303 & 373 (1971) and 2: 712 & 922. 1971.

Additional citations: INDOCHINA: Annam: *Poilane 6844* (W--2602629--cotype).

VITEX ALTISSIMA L. f., Suppl. Pl., imp. 1, 294. 1791.

Additional & emended synonymy: *Mail-elou* Rheede, Hort. Malab. 5: 1--2. 1685. *Mail-elou* Rheede, Hort. Malab. 5: pl. 1. 1685. *Vitex trifolia major indica, fructu carnosio, floribus minoribus & rarioribus* Breyn, Prod. Fasc. Rar. Pl., ed. 1, 2: 106. 1688. *Mailelou* Rheede apud Adans., Fam. Pl. 2: 12 & 200. 1763. *Vitex appendiculata* Willd., Gesell. Naturforsch. Freunde Berlin, ser. 2, 4: 203. 1803 [not *V. appendiculata* Rottb., 1885]. *Vitex altissima* Roxb. ex Wall., Numer. List [48], no. 1755, hyponym. 1829. *Vitex appendiculata* Wight ex Wall., Numer. List 86, no. 1755C. 1831. *Vitex latifolia* Wight ex Wall., Numer. List 86, no. 1755C. 1831; Steud., Nom. Bot., ed. 2, 2: 777. 1840 [not *V. latifolia* Blume, 1837, nor Lam., 1788, nor Mill., 1768]. *Vitex pubescens* ϕ *appendiculata* Wight ex D. Dietr., Syn. Pl. 3: 611, in syn. 1843. *Vitex altissima* Heyne ex Mold., Phytologia 5: 197, in syn. 1955. *Vetex altissima* Kurup, Journ. Bomb. Nat. Hist. Soc. 75: 325, sphalm. 1978.

Additional & emended bibliography: Rheede, Hort. Malab. 5: 1--2, pl. 1. 1685; Breyn, Prod. Fasc. Rar. Pl., ed. 1, 2: 106 (1688) and ed. 2, 2: 106. 1739; Adans., Fam. Pl. 2: 12 & 200. 1763; L. f., Suppl. Pl., imp. 1, 294. 1781; Lam., Encycl. Méth. Bot. 2: 614. 1788; Raeusch., Nom. Bot., ed. 3, 182. 1797; Willd., Gesell. Naturforsch. Freunde Berlin, ser. 2, 4: 203. 1803; Roxb., Hort. Beng. 46. 1814; Moon, Cat. Indig. Exot. Pl. Ceyl. 1: 46. 1824; Sweet, Hort. Brit., ed. 1, 1: 323 (1826) and ed. 2, 416. 1830; G. Don in Loud., Hort. Brit., ed. 1, 246. 1830; Wall., Numer. List 86. 1831; G. Don in Loud., Hort. Brit., ed. 2, 246. 1832; Loud., Hort. Brit., ed. 2, 551. 1832; G. Don in Loud., Hort. Brit., ed. 3, 246. 1839; J. Grah., Pl. Bomb. 155--156. 1839; Sweet, Hort. Brit., ed. 3, 551. 1839; Thwaites, Enum. Pl. Zeyl. 2: 244. 1839; D. Dietr., Syn. Pl. 3: 611. 1843; Voigt, Hort. Suburb. Calc. 469. 1845; Buek, Gen. Spec. Syn. Candoll. 3: 501 & 502. 1858; Thwaites & Hook. f., Enum. Pl. Zeyl., imp. 1, 244. 1861; Gamble, List Trees Darj. Dist. 61. 1878; Gamble, Man. Indian Trees, ed. 1, 297, 298, & 522. 1881; Trimen, Journ. Ceyl. Br. Roy. Asiat. Soc. 9: [Syst. Cat. Flow. Pl. Ceyl.] 69. 1885; Trimen, Handb. Fl. Ceyl. 3: 356--358. 1895; Nairne, Flow. Pl. West. India 247. 1894; Cooke, Fl. Presid. Bombay. ed. 1,

3: 428 & 429. 1905; Brandis, Indian Trees, imp. 1, 503 & 504, fig. 175. 1906; J. C. & M. Willis, Rev. Cat. Flow. Pl. Ceyl. [Parad. Man. Bot. 2:] 69. 1911; H. J. Lam, Verbenac. Malay. Arch. 369 & [371]. 1919; Lam & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 48. 1921; Troup, Silvicult. Indian Trees 2: 776. 1921; Alston in Trimen, Handb. Fl. Ceyl. 6: Suppl. 232. 1931; L. f., Suppl. Pl., imp. 2, 294. 1936; Alston, Kandy Fl. 64 & [65]. 1938; Kanjilal, Das, Kanjilal, & De, Fl. Assam 3: 479, 483, & 561. 1939; P. A. Russell, U. S. Dept. Agr. Pl. Invent. 159: 26 & 221. 1957; Cooke, Fl. Presid. Bombay, ed. 2, imp. 1, 2: 508--510. 1958; Abeywickrama, Ceyl. Journ. Sci. Biol. 2: 217. 1959; Worthington, Ceyl. Trees 348. 1959; Puri, Indian Forest Ecol. 1: 31, 148, 149, 153, & 176. 1960; Gaussen, Legris, & Viart, Ind. Council. Agr. Res. Veg. Map Ser. 1: 24, 40, & 41. 1962; Thwaites & Hook. f., Enum. Pl. Zeyl., imp. 2, 244. 1964; Qureshi, Sympos. Ecol. Res. Humid Trop. Veg. 127 & 128. 1965; Burkill, Dict. Econ. Prod. Malay Penins. 2: 2277. 1966; Cooke, Fl. Presid. Bombay, ed. 2, 2: 508--510. 1967; Ellis, Swaminathan, & Chandrabose, Bull. Bot. Surv. India 9: 12. 1967; Gaussen, Legris, & Viart, Ind. Council. Agr. Res. Veg. Map Ser. 4: 26. 1967; Kammathy, Rao, & Rao, Bull. Bot. Surv. India 9: 208 & 224. 1967; Ramaswamy, Bull. Boc. Soc. Beng. 21: 96. 1967; Sebastine & Vivekanathan, Bull. Bot. Surv. India 9: 166, 167, & 178. 1967; Vajravelu & Rathakrishnan, Bull. Bot. Surv. India 9: 43 & 44. 1967; J. L. Ellis, Bull. Bot. Surv. India 10: 1-7. 1968; Gunawardena, Gen. Sp. Pl. Zeyl. 147. 1968; Mold., Phytologia 16: 495--496 (1968) and 17: 11--13, 23, 45, 47, 50, 54, & 56. 1968; Mold., Résumé Suppl. 16: 10. 1968; Vajravelu, Joseph, & Chandrasekaran, Bull. Bot. Surv. India 10: 78. 1968; Legris & Blasco, Inst. Franç. Pond. Trav. Sec. Scient. Techn. 8 (1): 67. 1969; Agarwal, Wood-yield. Pl. India 67--68. 1970; Blasco, Inst. Franç. Pond. Trav. Sec. Scient. Techn. 10: 149, 173, & 426. 1971; Brandis, Indian Trees, imp. 2, 503 & 504, fig. 175. 1971; Mold., Fifth Summ. 1: 269, 279, 281, 303, 328, 337, & 373 (1971) and 2: 570, 712, 713, 720, 726, 728, 729, 922, 969, & 970. 1971; Anon., Biol. Abstr. 53 (10): B.A.S.I.C. S.266. 1972; Mold., Biol. Abstr. 53: 5252. 1972; Mold., Phytologia 23: 423 & 438. 1972; Hegnauer, Chemotax. Pfl. 6 [Chem. Reihe 21]: 663. 1973; R. R. Rao, Stud. Flow. Pl. Mysore Dist. [thesis] 2: 755. 1973; Rao & Razi, Journ. Mysore Univ. B.26: 103. 1973; Serbanescu-Jitariu & Mitroiu, Act. Bot. Hort. Bucurest. 1972-73: 116. 1973; Vartak, Bull. Indian Nat. Sci. Acad. 45: 253. 1973; Mani, Ecol. Biogeogr. India [Illies, Monog. Biol. 23:] 189, 200, & 772. 1974; Mold., Phytologia 28: 445, 460, 465, & 468. 1974; Hocking, Excerpt. Bot. A.25: 380. 1975; Menninger, Color Sky 10. 1975; Zimmerm. & Ziegler in Zimmerm. & Milburn, Transp. Pl. 1 [Pirson & Zimmerm., Encycl. Pl. Physiol., ser. 2, 1]: 502. 1975; L. H. & E. Z. Bailey, Hortus Third 1162. 1976; Meher-Homji, Feddes Repert. Spec. Nov. 88: 120. 1977; Subramanian & Kalyani, Indian Forest. 103: 113 & 117. 1977; Kurup, Journ. Bomb. Nat. Hist. Soc. 75: 325, 329, & 332. 1978; Sharma, Shetty, Vivekan., & Rathakrish., Journ. Bomb. Nat. Hist. Soc. 75: 16 & 33. 1978; Speangers & Balasubramanian, Trop. Ecol. 19: post

92. 1978.

Additional illustrations: Rheede, Hort. Malab. 5: pl. 1. 1685; Brandis, Indian Trees, imp. 1, 503, fig. 175. 1906; Alston, Kandy Fl. [65], fig. 347. 1938; Worthington, Ceyl. Trees 348. 1959; Brandis, Indian Trees, imp. 2, 503, fig. 175. 1971.

Recent collectors describe this species as a large shrub or small to very large tree, 2.5--33 m. tall, spreading, the bole often to 1.2 m. long, the crown to 10 m. wide, the trunk fluted, 15--90 cm. in diameter, the branches compressed, channelled, drooping, the branchlets tetragonal, dark-green, sulcate, the wood smooth, heavy, weighing 58--60 pounds per cubic foot, even-textured, varying from light olive-gray to brownish-gray or grayish-brown, capable of being seasoned, quite durable in water, very tough, disease-resistant, termite-proof, polishing well, not easily split, not readily warping, the bark varying from brown or tan to dull-brown, pale orange-brown, light-tan, ochraceous, yellowish, gray, grayish-white, yellowish-gray, or "creamish-yellow", fissured or cracked longitudinally, peeling off in narrow strips 2--3 cm. wide or in 2 x 2.5 inch scales, leaving sandy-colored scars, loose, rough, yellow and fibrous within, the living bark soft, yellow or dark-yellow, 5--10 mm. thick, the leaves compound, usually trifoliolate ("tripalmate"), papyraceous, acuminate, bronze-colored, usually appearing in March, the old leaves deciduous at about the same time, the inflorescence terminal, paniculate, flexuous or pendulous, the "cymes scorpioid", the flowers small, few, fragrant, the calyx pale-rusty or pale-brown, with a dull-violet base, the filaments pale-purple or white, the anthers black, the connective blackish, and the fruit drupaceous, round or spherical, about the size of a pea or 3/8ths inch long, at first green, later turning dark-blue, blue-black, purplish, purple, or black, smooth, often with small white dots, the pericarp fleshy, juicy at maturity.

The corollas are described as "white, tinged with blue" by Nairne (1894), Cooke (1905), and Sharma & al. (1978), "pale-violet or white" by Worthington (1959), or "cream-colored, with a white lip" by the Baileys (1976). Collectors also describe the corollas in various ways: "white" on *Saldanha* 13974, "white with prominent purple lip" on *Saldanha* 16938, "white, lower lip bluish-purple" on *Cramer* 4366, "blue" on *Hladik* 855, *Mueller-Dombois & Comanor* 67072528, *Ripley* 135, *Stevens* 472, and *Sweeney s.n.*, "bluish" on *Fosberg & Sacht* 53010 and *Saldanha* 14365, "pale-blue" on *Comanor* 567 and *Kostermans* 23289 & 23478, "bluish-purple" on *Jayasuriya* 1262, "bluish-purplish" on *Sumithraarachchi* DBS.508, "purplish-blue" on *Sumithraarachchi* DBS.462 and *Waas* 1267, "purplish-blue, lower lip blue" on *Jayasuriya* 1990, "purple" on *Cooray* 69111730R and *Ramamoorthy & Gandhi* F.F.P.2752, "bluish-purple with middle lobe of lower lip deep-purple" on *Amaratunga* 1023, "lilac" on *Bernardi* 14304, "violet-blue with lower lip a darker shade, white around margin" on *Davidse & Jayasuriya* 8393, "pale-violet" on *Amaratunga* 175, *Bernardi* 15240, and *Kostermans* 26007, "very light-pink, lower lobes dark-violet with a yellow stripe at base of tube,

the tube with maroon tinge" on *Davidse 7338*, "mauve-pink" on *Amaratunga 268*, "lower lip purple, side lobes and upper 2 lobes purplish-white" on *Saldanha 16553*, "limb border lavender, paler within, center lavender" on *Fosberg & Jayasinghe 57119*, and "corolla-tube dull pale-violet, white-hairy, with darker longitudinal dashes under the lip. 4 upper petals outside pale, inside light-blue, lip outside light-blue, inside with yellow base, further up violet-blue" on *Jacobs XI.K.6*.

Recent collectors have encountered *V. altissima* on steep forested slopes and exposed windswept rocky outcrops, in dry deciduous secondary forests and dry forests in general, in evergreen or semi-evergreen forests, wet deciduous forests, intermediate forests, and "disturbed uneven forests yo 10 m. tall", in jungles and dry-zone jungles, at the edges of forests or jungles, and in the forested margins of rock outcrops, on sandy, light-colored, sandy-pebbly, or "brown-red clayey-lateritic-loamy" soil, even in regions of more than 56 inches annual rainfall, from sealevel to 1100 m. altitude, in flower in January and from March to November, in fruit in April and from July to January.

Ramamoorthy & Gandhi, as well as Saldanha, report the species as "common" in Mysore, India, although the latter collector also found it only "occasional" in some localities. Ellis & al. found it growing along roadsides in Kerala, citing their nos. 20488 & 24004; Vajravelu & al. (1968) list it as "common" in Kerala, citing *Joseph 17138*, and (1967) "common" also in Madras, citing their no. 24106. Sebastine & Vivekanathan (1967) refer to it as "rare" in the Cheevapara region of Kerala, but as a "common tree on [the] western slopes of the Devicolam range", citing their no. 25337. Ellis (1968) found it in Andhra Pradesh, citing his no. 25554. Kurup (1978) asserts that it inhabits "tropical wet rainforests in [the] western Ghats, forming [the] top storey with *Messua ferrea*, *Hopea parviflora*, etc." Agarwal (1970) records it from "Bombay, Canara, Madras forest distrs., Cochin (Kerala), and Ceylon". Shetty & al. (1978) refer to it as "common" and cite *Rathakrishnan 37981* and *Sharma 35725*. Speangers & Balasubramanian (1978) found it growing in dry tropical semi-evergreen forests of southeastern India with *Canthium dicoccum*, *Manilkara hexandra*, *Hemidesmus indicus*, etc., in monsoon stream areas.

Gausson & al. (1967) found *V. altissima* "in the intermediate storey of the Toona-Garuga Series"; Ramaswamy (1967) cites his no. 2707 from Savandurga. Kammathy & al. (1967) encountered the tree in dry deciduous forests in Mysore, citing *Barnes s.n.* Qureshi (1965) records it from Madras, while Gamble (1881) says that the "Tree [is] only found in the southern S&al forests". Puri (1960) lists it from the top and middle layers of tropical evergreen forests of several luxuriant strata with an understory of many ferns and tall herbs in northern Kanara of the western coast of Malabar; in the top storey of southern tropical wet evergreen forests in southern Coimbatore the tree is 10--25 m. tall. In Assam, Kanjilal & al. (1939) report that it ascends to 4000 feet altitude, the hard close-grained wood "valuable for building construction, furniture, carts, boats, oil-mill pestles, etc."

Nairne (1894) describes the species as "plentiful" in southern Concan and Canara, asserting that it is "A beautiful tree when in flower". Clarke (1885) gives its distribution as the "Deccan Peninsula, especially the west side, up to 4000 ft., common". Troup (1921) tells us that "The tree stands a moderate amount of shade, especially in youth; it produces root-suckers. Growth, according to Gamble, 8 to 9 rings per inch of radius, giving a mean annual girth increment of 0.7 to 0.78 in." It is also said to "regenerate anywhere around". Cooke (1958) gives its distribution as only west peninsular India and Ceylon, citing *Dalzell & Gibson s.n.*, *Law s.n.*, and *Stocks s.n.* from Concan and *Dalzell & Gibson s.n.*, *Talbot s.n.*, and *Woodrow s.n.* from Kanara, where he says that it is "plentiful" and "abundant" in evergreen forests, and that its wood is used for building purposes, furniture, and carts, being in much demand in northern Kanara.

The Baileys (1976) give the species' distribution as Pakistan, India, and Sri Lanka, asserting that it is a "Valuable timber tree used in cabinet work and building construction". Agarwal (1970) says that "It is considered very good for house-construction, flooring, in well-construction, for carts, felloes of wheels, furniture and rarely for sleepers [=railroad ties]. It can be tried for tool handles." Railroad ties made of this wood are said to last 30 years.

In Sri Lanka most authors and collectors describe the species as abundant. Thwaites & Hooker (1861) say that it is "Common in forests, up to an elevation of 3000 feet", citing *Thwaites C.P.* 1958, and noting that "This tree produces one of the most valuable timbers in the island for building and other purposes". Worthington (1959) lists it from the "low country, dry zone, but also found elsewhere, the wood used for furniture, wagons, and railroad ties". He collected it in the submontane region on the dry zone border. Hallier (1918) found it in cultivation, citing his *no.* C.241, deposited in the Hamburg herbarium. Trimen (1895) comments: "A valuable timber-tree. Wood hard, heavy, close-grained, smooth, tough, durable, grey; the carpenters distinguish several varieties. The bark is used as a fomentation in rheumatic swellings. The wood affords a yellow dye, which is not much employed". It would be interesting to know if the carpenters' varieties correspond in any way with the two taxonomic varieties here accepted.

Also in Sri Lanka Bernhardt says "arbor obvia tota in insula frequens, cortice claro, inflorescentiae candalabrifformes". Davidse & Sumithraarachchi, as well as Comanor and Sohmer, refer to *V. altissima* as "common" in the forests, but Fosberg & Jayasinghe refer to it as "infrequent". Cooray calls it a common subcanopy tree in low-stature evergreen forests dominated by *Mischodon zeylanicus* on reddish soil. Cramer reports it "common in open dry country", while Fosberg & Sachet found it "common at edge of forest around extensive granite outcrops". Kostermans reports it common in both deciduous and evergreen forests, while Hladik reports it "common in dry zone near irrigation tank [lake] where undergrowth has been cut"; Mueller-Dombois encountered it as com-

mon in shallow sand between outcropping rocks along roadsides; he and Jayasuriya report it "rather common in jungle forests", while he and Comanor affirm that it is a "prominent upper canopy tree at forest edges next to villu grassland". Ripley describes it as common in "flushes". Sumithraarachchi came upon it in jungles.

Sweet (1826), Don (1830), and Loudon (1832) all assert that *V. altissima* was introduced into English gardens from Sri Lanka in 1802. It is also cultivated in Maryland and Florida, on the basis on material imported from India by Menninger and represented by P. A. Russell 194521. Jacobs XI.K.6 was collected from cultivated material in Java.

Vernacular names reported by recent collectors and/or authors include the following: "ahoi", "anhvi", "arong", "ashoi", "banalgay", "bulgi", "inhet-longhing", "jadh-gach", "kada-manakku", "kaddamanakku", "kaddamananakku", "maila", "mairole", "mayilei", "mee-yan", "meeyan-mililla-gass", "milla", "mililla-gass", "miyan-milla", "mon-awal", "sapu-milla", "selong-phang", "tall chaste-tree", "tallest chaste-tree", and "tin-patte".

Linnaeus' original (1781) description of *V. altissima* is: "VITEX foliis ternatis integerrimis, panicula verticillata: spicis verticillatis, bacca trisperma. Habitat in vastis sylvis Zeylonae. König. Foliola ovata, utrinque acuminata, supra glabra, subtus pubescentia." König 77, in part, from Sri Lanka, in the Linnean Herbarium in London, is the nomenclatural holotype. It is worth noting here that Moon (1824) correctly maintains *V. altissima* as a distinct species separate from what he calls *V. pubescens* (= *V. pinnata*), both in Sri Lanka. The *V. pubescens* of Vahl, referred to in the synonymy above, is *V. pinnata* and it is to this taxon that Moon was obviously referring. The date of publication of the *V. pubescens* Heyne is erroneously given as "1824" by Santapaugh & Waugh (1963).

The Cooray 69111730R collection, cited below, was gathered as a voucher for ecologic observations. Similarly, Ripley 78, 135, & 247 were collected as vouchers for primate ecology studies. Lewis, on the label accompanying the collection cited below, comments that this "tree [is] taller and straighter than the ordinary 'milla'".

It is worth noting here that *Kostermans* 23478 is only very sparsely puberulent, rather than pubescent, on the lower leaf surfaces. Worthington (1959) erroneously refers to the fruits as "berries" -- they are drupes. The illustration given by Alston (1938) certainly looks more like *V. negundo* L. than it does *V. altissima*! Fosberg 56373 is accompanied by a label asserting that the plant was a "somewhat depressed spreading somewhat woody herb, flowers orange, closed in afternoon, occasional in fencerow along weedy roadside" -- obviously a case of mixed labels or some other stenographic mixup. Similarly, the label with *Sohmer* 8237 in the New York and Washington herbaria asserts that the plant had "flowers orange". A letter to me from Dr. Sohmer, dated June 17, 1977, says "I have gone back to my field book and find that for my collection 8237 I had only the following notation down: '50 ft. high tree'. There is nothing about flower color in my notes, and

I assume that either an enthusiastic typist added the notation to the label that you saw, or it was mistakenly transferred from somewhere else."

Rheede's illustration (1685) is often cited as representing *f. juv. alata*, but it plainly depicts the typical adult form of *V. altissima*. The name, *V. pinnata* has been applied mistakenly to *V. altissima* by many authors and collectors, notably by Alston (1931, 1938) and Abeywickrama (1959) among authors and by Amaratunga, Cooray, Cramer, Dittus, Hladik, Mueller-Dombois, Mueller-Dombois & Comanor, Ripley, Sohmer, Waas, and Worthington among collectors. It has also been misidentified as *V. trifolia* by Sohmer, Sumithraarachchi, and others.

The *Kostermans* 24109 and *Moldenke & al.* 28188, 28189, 28220, 28228, & 28238, distributed as typical *V. altissima*, actually represent *f. subglabra* Thwaites, while *Flock* 362 and *Rodgers* MRC. 164 are *V. bungenensis* Mold.

Additional & emended citations: INDIA: Karnataka: *Collector undetermined s.n.* [Mysore] (Pd); *Ramamoorthy & Gandhi* H.F.P.2752 (W--2653611); *Saldanha* 13974 (N), 14365 (N), 15116 (W--2653612), 16553 (N), 16938 (N); *W. D. Stevens* 472 (Ln--232352); *Talbot s.n.* [N. Canara] (Pd). Kerala: *Hohenacker* 115 (B, Mu--620, Mu, Mu, N, S, S), *s.n.* [prope Mangalore] (B); *Stocks, Law, &c. s.n.* [Malabar, Concan, &c.] (Br, Mu--622, N, Pd, S, W--2497091, W--2497123). Tamil Nadu: *Kostermans* 26007 (W--2828795); *G. Thomson s.n.* [Mont. Nilghiri & Kurg] (M, Mu--621, Pd, S); *R. Wight* 2325 (B, Mu--1344, Mu--1345, Pd, Pd, S, S). State undetermined: *Wallich* 1755 (Pd), 1755c (Pd). SRI LANKA: *Amaratunga* 175 (Pd), 268 (Pd), 1023 (Pd); *Bernardi* 14304 (W--2765949), 15240 (N, W--2808311); *Comanor* 567 (N, W--2762569), 576 (N, Pd, W--2762570); *Cooray* 69111730R (Ac, N, W--2612109); *Cramer* 4366 (W--2807756); *Davidse* 7338 (Ld, W--2803773), 7446 (Ld, W--2806274); *Davidse & Jayasuriya* 8393 (Ld, W--2808657); *Davidse & Sumithraarachchi* 8153 (Ld), 9075 (Ld, W--2808696); *Dittus* WD.69102302 (W--2765146, W--2803412), WD.71090606 (W--2805422); *F. R. Fosberg* 56373 (N, W--2811402); *Fosberg & Jayasinghe* 57119 (Ld); *Fosberg & Sachet* 53010 (Ld, N), 53011 (Tu); *Gardner s.n.* [Jaffna, C.P.1958] (Pd, Pd); *Hladik* 855 (Pd, W--2761100); *Jayasuriya* 1262 (Ac, Ld), 1990 (Ld, W--2807845); *Kostermans* 23289 (Ac), 23478 (Ac, N); *J. P. Lewis s.n.* [Mulliativu] (Pd, Pd); *Moldenke, Moldenke, Dassanayake, & Jayasuriya* 28329 (Gz, Ld, Pd, W--2764534); *Moldenke, Moldenke, & Jayasuriya* 28256 (Ac, Pd, W--2764523); *Mueller-Dombois* 67081404 (Pd, W--2586025A), 68102114 (N); *Mueller-Dombois & Comanor* 67072507 (Pd, Pd, W--2586024A), 67072528 (Pd, W--2586023A); *Reitz* 30027 (Ac, W--2762786); *Ripley* 78 (Pd, W--2719624), 135 (Pd, W--2719619), 189 (Pd, W--2715939), 247 (W--2719625); *Sohmer* 8210 (N, W--2808328), 8237 (Lc, N, W--2807754); *Sohmer & Jayasuriya* 10673 (N); *Sumithraarachchi* DBS.462 (W--2807746), DBS.508 (W--2807761); *Thwaites* C.P.1598 (Pd); *Waas* 1267 (W--2807769); *Wirawan s.n.* [Wilpattu, 15.9.68] (Pd, W--2612111); *Worthington* 383 (K), 1325 (K), 3764 (K), 4506 (K), 4906 (K), 5013 (K), 5552 (K), *s.n.* [Kandy, Oct. 24, 1957] (K). THAILAND: *Phengklai, Tamura, Niyomdham, & Sangkachand* 4269 (Z). CULTIVATED:

Florida: Gillis 8390 (Ft. Z). Java: Herb. Hort. Bot. Bogor. IV.A.64 (W--449140); Jacobs XI.K.6 (Ba).

VITEX ALTISSIMA f. juv. *ALATA* (Willd.) Mold., Phytologia 28: 468. 1974.

Synonymy: *Vitex alata* Willd., Gesell. Naturforsch. Freunde Berlin, ser. 2, 4: 203. 1803 [not *V. alata* Kurz, 1885, nor Roxb., 1803, nor Schau., 1885, nor Wall., 1947]. *Vitex alata* Roth ex G. Don in Loud., Hort. Brit., ed. 1, 246. 1830. *Vitex appendiculata* Rottl. ex C. B. Clarke in Hook. f., Fl. Brit. India 4: 584, in syn. 1885 [not *V. appendiculata* Willd., 1803]. *Vitex altissima* var. *alata* Trim. ex J. C. & M. Willis, Rev. Cat. Flow. Pl. Ceyl. 69. 1911. *Vitex altissima* var. *alata* (Willd.) Mold., Revist. Sudam. Bot. 5: 2. 1937. *Vitex altissima* f. *alata* (Willd.) Mold., Phytologia 22: 126. 1971.

Bibliography: Rheede, Hort. Ind. Malab. 5: 1--2, pl. 1. 1685; Breyn, Prod. Fasc. Rar. Pl., ed. 2, 106. 1739; Adans., Fam. Pl. 2: 12 & 200. 1763; Willd., Gesell. Naturforsch. Freunde Berlin, ser. 2, 4: 203. 1803; Roxb., Hort. Beng. 46. 1814; Roth, Nov. Pl. Sp. 316. 1821; Sweet, Hort. Brit., ed. 1, 1: 323 (1826) and ed. 2, 416. 1830; G. Don in Loud., Hort. Brit., ed. 1, 246 (1830) and ed. 2, 246. 1832; Loud., Hort. Brit., ed. 2, 551. 1832; G. Don in Loud., Hort. Brit., ed. 3, 246. 1839; J. Grah., Pl. Bomb. 156. 1839; Sweet, Hort. Brit., ed. 3, 551. 1839; D. Dietr., Syn. Pl. 3: 611. 1843; Schau. in A. DC., Prodr. 11: 685. 1847; Buek, Gen. Spec. Syn. Candoll. 3: 501. 1858; Dalz. & Gibs., Bomb. Fl. 201. 1861; Thwaites & Hook. f., Enum. Pl. Zeyl., imp. 1, 244. 1861; Kurz, Forest Fl. Brit. Burma 2: 269, 272, & 612. 1877; C. B. Clarke in Hook. f., Fl. Brit. India 4: 584. 1885; Nairne, Flow. Pl. West. India 247. 1894; Trimen, Handb. Fl. Ceyl. 3: 358. 1895; Cooke, Fl. Presid. Bombay, ed. 1, 428 & 429. 1905; Brandis, Indian Trees, imp. 1, 504. 1906; J. C. & M. Willis, Rev. Cat. Flow. Pl. Ceyl. [Perad. Man. Bot. 2:] 69. 1911; Lam. & Bakh., Bull. Jard. Bot. Buitenz., ser. 3, 3: 48. 1921; Mold., Revist. Sudam. Bot. 5: 2. 1937; Mold., Geogr. Distrib. Avicenn. 40. 1939; Mold., Prelim. Alph. List Inv. Names 49 & 50. 1940; Mold., Alph. List Inv. Names 52. 1942; Mold., Known Geogr. Distrib. Verbenac., ed. 1, 55, 75, & 102. 1942; Menninger, 1947 Cat. Flow. Trees 25. 1946; Menninger, Introd. Offer Flow. Tree Coll. [1]. 1946; Razi, Journ. Mysore Univ. 7 (4): 64. 1946; Mold., Alph. List Inv. Names Suppl. 1: 16. 1947; Mold., Known Geogr. Distrib. Verbenac., ed. 2, 128, 165, & 200. 1949; Menninger, 1953 Cat. Flow. Trees 16. 1953; Menninger, 1955 Price List n.p. 1954; Mold., Phytologia 5: 200--202. 1955; Cooke, Fl. Presid. Bombay, ed. 2, imp. 1, 508 & 510. 1905; Puri, Indian Forest Ecol. 155. 1960; Dale & Greenway, Kenya Trees 593. 1961; Thwaites & Hook. f., Enum. Pl. Zeyl., imp. 2, 244. 1964; Cooke, Fl. Presid. Bombay, ed. 2, imp. 2, 508 & 510. 1967; Agarwal, Wood-yield. Pl. India 67. 1970; Brandis, Indian Trees, imp. 2, 504. 1971; Mold., Phytologia 22: 126. 1971; Anon., Biol. Abstr. 53 (10): B.A.S.I.C. S.266. 1972; Mold., Biol. Abstr. 53: 5252. 1972; Mold., Phytologia 23: 423. 1972; Rao & Razi, Journ. Mysore Univ. B.26: 103. 1973; Mold.,

Phytologia 28: 465 & 468. 1974; Hocking, Excerpt. Bot. A.25: 380. 1975; Menninger, Color Sky 10. 1975.

Although long regarded as a separate species or as a distinct variety of *V. altissima* L.f. by numerous authors in the past, it seems from field observation that this taxon is merely a "juvenile form" of *V. altissima* distinguished by its leaves having more or less broadly winged petioles, the wings being 8--16 mm. wide, continuous, dilated, basally cordate and subamplexicaul. Such leaves are also found on the turions or "watersprouts" often produced on the periphery of the stumps of cutdown mature individuals. They may also be seen on seedlings and on the "suckers" sent up from underground runners. Some authors have also observed that the leaves on non-flowering branches of mature trees may have somewhat broader margins on their petioles than are seen on those of neighboring flowering branches on the same tree. This was confirmed by my wife and myself in the field in Sri Lanka. In our experience, however, these nowhere approach the width of the wings seen on the juvenile plants, turions, and seedlings. On seedlings the lowermost leaves may even be unifoliolate. Some authors (e.g., Clarke, 1885) assert that in this juvenile form the leaves are often 5-foliolate instead of the normal 3-foliolate of mature trees.

Numerous writers describe the flowers and fruits of "*Vitex alata*", but it seems most likely that they are referring, not to this form, but to *V. limonifolia* Wall., *V. peduncularis* Wall., or *V. peduncularis* var. *roxburghiana* C. B. Clarke, which are the taxa regarded as "*V. alata*" by Kurz, Roxburgh, Schauer, and Wallich.

Agarwal asserts that "*V. alata* Heyne" grows in the western part of peninsular India and is "common on [the] Western Ghats in evergreen forests", the wood described as grayish-brown, moderately hard, rough, capable of being seasoned, taking a fair polish, appearing to be durable, and weighing 26 kg. per cubic foot. He adds that "Although from the available records its useful property is not found but from the specimens it appears that it can be usefully exploited for cabinet work & in construction purposes". Cooke (1958), under the name *V. altissima* var. *alata* Trimen, asserts that it differs from the typical variety in having its "Petioles always rather broadly winged, widened and cordate at the base; leaflets very finely pubescent above, densely grey-pubescent beneath; flowers more laxly arranged", flowering in April and May, citing it from Concan (*Nimmo s.n.*), Deccan (*Bhiva s.n.*), "S. M. Country" (*Law s.n.*), and Kanara (*Talbot s.n.*). It would appear from this that he, at least, had seen flowering specimens with the "juvenile" leaf characters.

Dale & Greenway (1961) aver that "*Vitex alata* Heyne, an Indian species, has been collected from the Gogoni forest, Kwale district [Kenya]: it should not be regarded as indigenous without further collection".

Puri (1960) found what he called *V. altissima* var. *alata* in the "first storey with *Lagerstroemia*, *Sideroxylon*, and *Holigarna* spp. in dense evergreen tropical forests" in northern Kanara. He adds

that there "The middle storey is poor or absent; likewise ground cover except for seedlings of the trees". This implies that the trees were not only flowering, but were producing fruit and seedlings.

Sweet (1826) and Loudon (1832) agree that "*V. alata* Roth" was introduced into cultivation in England from the "E. Indies" in 1818, but Don (1830) gives the date of introduction as 1820.

Clarke (1885) describes "*V. alata* Heyne" as having "leaves 3-foliolate [but some branches, apparently of this, collected by Shuter, Law, and Stocks, have some of the leaves 5-foliolate], leaflets subsessile broadly lanceolate subentire mature glabrate above thinly pubescent beneath, wing of the petiole broad cordate at base, panicles terminal compound fulvous-villous, corolla scarcely 1/4 in., drupe 1.5 in. diam." He cites *Rottler s.n.* and *Van Royen s.n.* from Madras and *Cleghorn s.n.* from Mysore, commenting: "Scarcely differs from *V. altissima* but by the wing of the petiole, which is 1/3 -- 2/3 in. wide, continuous [in *V. altissima* sometimes winged upwards], dilated, cordate and subamplexicaul at the base; leaflets 2 1/2 in. wide [in *V. altissima* 1 3/4 in.]."

Trimen (1895) gives the same description given by Cooke, but adds this interesting comment to the effect that "var. *alata* Trimen.... is kept as a species in Fl. B. Ind., but not given for Ceylon. Mr. J. P. Lewis informs me that it has a different habit of growth to the ordinary tree, being taller and straighter. He found a few trees only at Vavaddai and Neduchaddikkulam". This, again, implies that at least Lewis had seen tall mature trees with the petiolar characters of *alata*.

Lam & Bakhuizen van den Brink (1921) distinguish the two taxa (regarded by them as 2 separate species) as follows:

Petioles 3.8--6.2 cm. long, winged toward the apex, the wings rotundate, altogether 0.8--1 cm. broad; leaflets somewhat pubescent beneath.....*altissima*
 Petioles 7--15 cm. long, winged toward the base, sometimes also towards the apex, the wings 0.4--1.5 cm. broad; leaflets pubescent beneath.....*alata*

Nairne (1894) says for "*V. alata*": "scarcely differs from the last [*V. altissima*], but the wing of the petiole is more pronounced, and the leaflets sometimes 5, flowers pale-yellow, or tinged blue [in *V. altissima* white tinged with blue]. S. M. country and Wari (D.). Konkan (Lisboa)." Here, again, it is implied that flowering trees with the *alata* characters have been seen, and, furthermore, that the corollas differ in color.

In this connection, Dr. Richard J. Brumpton, in a letter to me dated March 28, 1975, says: "I have read with interest your report and conclusions about *Vitex alata* as the juvenile form of *V. altissima*..... Let me confess that my interest is genetic rather than taxonomic; the kind of observation which you cite begs the whole question of 'control of differentiation'. It is indeed hard to imagine the mechanism capable of switching the phenotype between juvenile and adult stages. (In this part of Britain we see an al-

lied phenomenon in that the leaves on lower branches of holly are more heavily thorned than those in the upper part of the tree)." In this connection it is worth pointing out here again that juvenile leaves with very different morphological characters are often seen in *Acacia* and *Eucalyptus*, even with differences in phyllotaxy in some cases, and numerous juvenile forms of gymnosperms have been awarded formal nomenclatural status [vid., Rehder, Man. Cult. Pl., ed. 2 (1940) 53, 54, 59, 60] as well as the well-known case of *Moultonia singularis* Balf. f. & W. W. Sm.

Clarke (1885) says after his description of "*V. alata* Heyne": "Dalz. & Gibs. Bomb. Fl. 201, not of Schauer, nor of Kurz", implying, I suppose, a binomial, *V. alata*, accredited to Dalz. & Gibs. and one accredited to Kurz; however, since he does not actually write out these homonymous binomials I am not recognizing them as having been effectively published and they do not appear in the synonymy given by me. *Vitex alata* Schau. is a synonym of *V. limnifolia* Schau.; *V. alata* Roxb. is *V. peduncularis* f. juv. *roxburghiana* (C. B. Clarke) Mold.; and *V. alata* Wall. is *V. peduncularis* Wall.

The only common or vernacular names listed for *V. altissima* f. juv. *alata* are "baruna", "milla", and "winged chaste-tree". The *Mail-elou* Rheede, often included in its synonymy, apparently belongs, rather to that of typical *V. altissima* L. f.

On *Worthington* 2332 the lowest leaves are unifoliolate. The collections represented by *Alston* 1328 and *Moldenke* & al. 28122, 28192, & 28252 were all (according to their accompanying labels) taken from "a young plant" or a "sapling" and *Moldenke* & al. 28223 from "watersprouts from a cutdown stump - neighboring mature trees without broad wings". *Meijer* & *Balakrishnan* 135 bears labels reading "tree bole 15 ft., crown 20 ft., girth 6 ft., bole fluted and twisted at base, inner bark orange-brown, sapwood ochre, hard" -- obviously taken from a mature tree, but there are no inflorescences on the herbarium sheets and the leaves are all of the *alata* type! Most important, however, is the R. Wight collection, cited below, from India which has the broadly alate petioles of *alata* and also inflorescences in full anthesis!

Material of *V. altissima* f. juv. *alata* has often been identified and distributed in herbaria as typical *V. altissima* L. f. or as its f. *subglabra* Thwaites. On the other hand, the *J. P. Lewis* s.n., distributed as "*V. alata*", actually seems to be typical *V. altissima* L. f.

Citations: INDIA: Andhra Pradesh: *Santapau* 20799 (Xa); *Santapau* & *Wagh* 20697 [*Wagh* 2748] (Xa); *Wagh* 1306 (Xa), 2859 (Xa). State undetermined: *R. Wight* s.n. [Peninsula Ind. orientalis] (N). SRI LANKA: *Alston* 1328 (Pd); *Collector undetermined* s.n. (Pd); *Fosberg* & *Ripley* 51942 (Pd, W--2764803); *König* 77 in part [Herb. Linn. 811/3] (Ls, N--photo, Z--photo); *Meijer* & *Balakrishnan* 135 (Pd, W--2716026); *Moldenke, Moldenke, Dassanayake, & Jayasuriya* 28192 (Ac, Gz, Kh, Ld, Pd, Tu, W--2764435); *Moldenke, Moldenke, & Jayasuriya* 28223 (Ac, E, Gz, Kh, Ld, Pd, Tu, W--2764478), 28252 (E, Pd, Tu, W--2764516); *Moldenke, Moldenke, Jayasuriya, & Sumithraarach-*

chi 28122 (Ac, Gz, Kh, Ld, Pd, W--2764553); *Mueller-Dombois & Conmanor* 67062530 (W--2586022A), 68102501 (W--2612108); *Ripley* 246 (Pd); *Worthington* 2332 (K). GREATER SUNDA ISLANDS: Java: *Backer s.n.* [Sept. 1903] (Bz--24714); *Koorders & Koorders-Schumacher* 44484b [449*] (Bz--23800), 44720b (Bz--23799). Sumatra: *Bal* 30 (Bz--23801); *Teijsmann* 4287 *H.B.* (Bz--23802). CULTIVATED: Florida: *Menninger s.n.* [Stuart, August 8, 1946] (N); *H. N. Moldenke* 21477 (Z). India: *Voigt s.n.* [H. B. Seramp.] (Cp, N--photo, Z--photo). Java: *Herb. Bur. Agric. Manila IV.A.64* (N); *Herb. Hort. Bogor. XI.K.7* (Bz--25856, N), *XI.K.7a* (Bz, Bz, Bz, N), *XII.B (VI)* 28 (Bz--25857, Bz--26246, Bz, Bz, N). Netherlands: *Herb. Lugd.-bat.* 908267-237 (Le); *Royen* 87 (E--photo, Le, N, N--photo, Z--photo), 777 (Le).

VITEX ALTISSIMA f. *SUBGLABRA* Thwaites

Additional & emended synonymy: *Vitex zeylanica* Turcz., Bull. Soc. Imp. Nat. Mosc. 36 (2): 223. 1863 [not *V. zeylanica* Burm. f., 1768]. *Vitex altissima* var. *zeylanica* (Turcz.) C. B. Clarke in Hook. f., Fl. Brit. India 4: 584. 1885. *Vitex altissima* var. *zeylanica* Clarke ex J. C. & M. Willis, Rev. Cat. Flow. Pl. Ceyl. 69. 1911.

Additional & emended bibliography: Thwaites & Hook. f., Enum. Pl. Zeyl. 244. 1861; Trimen, Journ. Ceyl. Br. Roy. Asiat. Soc. 9: [Syst. Cat. Flow. Pl. Ceyl.] 69. 1885; Trimen, Handb. Fl. Ceyl. 3: 358. 1895; J. C. & M. Willis, Rev. Cat. Flow. Pl. Ceyl. [Perad. Man. Bot. 2:] 69. 1911; Mold., Phytologia 16: 496. 1968; Mold., Fifth Summ. 1: 281 & 373 (1971) and 2: 713, 731, & 922. 1971; Mold., Phytologia 23: 438. 1972.

This is a form of questionable validity. It is described as having its mature leaf-blades "quite glabrate beneath" and 5 in number. In several collections cited below they are, indeed, apparently completely glabrous on both surfaces, but in others the depressions in the veinlet reticulation beneath are microscopically puberulent much as might be seen if the hairs were all mechanically brushed off from the typical form. Most of the specimens seen by me have 3 leaflets. More field work is needed to ascertain if this form is worth maintaining. Trimen (1895) says that it "is scarcely worth notice". Clarke (1885) cites *Thwaites s.n.* and *Walker s.n.* from Sri Lanka.

It should be noted that Burman's *V. zeylanica* is actually a species of *Stereospermum* in the *Bignoniaceae*, but it effectively precludes the use of the epithet, "*zeylanica*", by Turczaninow (1863) and therefore also by Clarke (1885). Turczaninow's *V. zeylanica* is based on *Gardner* 674 from Sri Lanka.

Recent collectors describe *V. altissima* f. *subglabra* as a large subcanopy tree, 4--20 m. tall, the trunk 1 m. or more in girth, to 20 cm. in diameter, with steep buttresses, the bole 15 feet tall, the crown 20 feet wide, the bark "ochraceous-rosy-red" or light pinkish-brown, with many cracks, soft, 1 mm. thick, the living bark orange-brown, 3 mm. thick, the inner bark yellow when freshly cut, the sapwood ochre, the leaves 3- or 5-foliolate, the

fruit green "when mature" [more probably when immature!], borne in "bunches on scorpioid cymes". They have found it growing in jungles and jungle margins, in submontane forests on steep hill-sides, in low-stature evergreen forests dominated by *Mishodon zeylanicus* on reddish soil, "amongst cultivated land" and in "forest confines in open" in the wet zone, at low altitudes to elevations of 2500 feet. Kostermans refers to it as "common" and the Moldenkes refer to it as "rather abundant", but Bernardi claims it to be "rare". It has been collected in anthesis in January, May, and June, and in fruit in January and October. Worthington comments that in the wet zone in Sri Lanka the leaves have "very long drip-points" as compared to those in drier districts.

The corollas are said to have been "pink" on *Kostermans 24109*, "pale-violet" on *Amaratunga 1343*, and "pale-blue and lilac" on *Bernardi 14183*. *Moldenke & al. 28238* exhibits one leaf with 5 leaflets; *no. 28189* was taken from a tree where only some branches had somewhat alate leaves, others non-alate, and the same situation was found on the tree from which *no. 28188* was taken; the trees from which *nos. 28228* and *28238* were taken had many leaves exhibiting narrow wings on the petioles.

It should be mentioned that, in spite of what Clarke asserts (1885), Thwaites, in the 1861 work cited by Clarke, actually does not propose a trinomial name for the subglabrous-leaved tree. His statement (for *V. altissima*) is merely "*Folia subglabra vel subtus molliter pubescentia, petiolo saepe plus minus alato*".

The only vernacular name specifically reported for this form is "milla".

Material of this form has been identified as typical *V. altissima* L. f. by many workers and also as *V. pinnata* L. and so distributed in herbaria. On the other hand, the *Collector undetermined s.n.* at Peradeniya and *Ripley 246*, distributed as this form, actually represent *f. juv. alata* (Willd.) Mold.

Additional citations: SRI LANKA: *Amaratunga 1343* (Pd); *Balaskrishnan & Jayasuriya NBK.886* (N, Pd, W--2720184); *Bernardi 14183* (W--2766472); *Kostermans 24109* (Ac, Pd, W--2716116); *Meijer 412* (Pd, W--2718562); *Moldenke, Moldenke, & Jayasuriya 28220* (Ac, Gz, Kh, Ld, Pd, Tu, W--2764494, Z), *28228* (Ac, E, Gz, Kh, Ld, Pd, Tu, W--2764489), *28238* (Ac, E, Gz, Kh, Ld, Pd, Tu, W--2764480); *Moldenke, Moldenke, Jayasuriya, & Sumithraarachchi 28188* (Ac, E, Gz, Kh, Ld, Pd, Tu, W--2764443), *28189* (Ac, E, Gz, Kh, Ld, Pd, Tu, W--2764442); *Mueller-Dombois 68102114* (Ld, Pd, W--2612110); *Sohner, Jayasuriya, & Eliezer 8271* (Lc, N, W--2807753); *Waas & Peeris 540a* (W--2803418); *Walker s.n.* [Ceylon] (Pd--type); *Worthington 2528* (K), *3672* (K).

VITEX ALTMANNI Mold.

Additional bibliography: Mold., *Phytologia* 15: 227. 1967; Mold., *Fifth Summ.* 1: 328 (1971) and 2: 922. 1971.

VITEX AMANIENSIS Pieper

Additional bibliography: Fedde & Schust., *Justs Bot. Jahresber.*

57 (2): 402. 1938; Mold., *Phytologia* 15: 227. 1967; Mold., Fifth Summ. 1: 238 (1971) and 2: 922. 1971.

Tanner describes this species as a tree, 8 feet tall, growing in groups, the stem single, the flowers aromatic, and the corollas "mauve". He encountered it in thickets on rich brown loam, flowering in October. He records the vernacular name, "mnegege", and asserts that the roots are used medicinally for "sharp pains in the stomach", the roots being boiled and the resulting liquid drunk.

Additional citations: TANZANIA: Tanga: *Tanner* 3315 (N).

VITEX AMBONIENSIS Gürke

Additional & emended bibliography: Gürke in Engl., *Pflanzenw. Ost-Afr. C*: 340. 1895; J. G. Baker in Thiselt.-Dyer, *Fl. Trop. Afr.* 5: 317, 329, & 330. 1900; Fedde & Schust., *Justs Bot. Jahresber.* 57 (2): 403. 1838; H. N. & A. L. Mold., *Pl. Life* 2: 81. 1948; J. K. Jacks., *Journ. Ecol.* 44: 353. 1956; Dale & Greenway, *Kenya Trees Shrubs* 593. 1961; Watt & Breyer-Brandwijk, *Med. Poison Pl. S. East. Afr.*, ed. 2, 1055 & 1454. 1962; Mold., *Phytologia* 16: 496 (1968) and 17: 42. 1968; Van der Schijff, *Check List Vasc. Pl. Kruger Natl. Park* 81. 1969; Mold., Fifth Summ. 1: 234, 238, 241, 245, 246, 248, 252, 257, & 373 (1971) and 2: 713, 720, 789, 922, & 923. 1971; Palmer & Pitman, *Trees South. Afr.* 3: 1950, 1951, 1954--1955, 1957, & 1962. 1972.

Additional illustrations: Palmer & Pitman, *Trees South. Afr.* 3: 1954. 1972.

Ward encountered this species in sandy soil in the green-tree veld, at 200 feet altitude, flowering in November, and describes it as a shrub, 18 feet tall, with mauve corollas. Dale & Greenway (1961) assert that in Kenya it inhabits the scrub and forest edge in the coastal districts. They record the vernacular name, "mufudu", and cite *Jeffery K.152, Napier 6327*, and *Van Someren 64* from Kenya. Van der Schijff (1969) cites *Lam 27, "C.5434"*, and *Van der Schijff 152, 740, 2902, & 3689* from Kruger National Park. Watt & Breyer-Brandwijk (1962) list the vernacular name, "mialali", and note that the plant is a Swahili antidote for snake-bite.

Palmer & Pitman (1972) list the common names, "Amboni vitex" and "mupfumbu-pfumbu", and say that the species "enters South Africa in the north eastern Transvaal and northern Zululand, and South West Africa in the Caprivi Strip, growing in coastal and inland bush, often on quartzite ridges, in scrub forest, and in savannah. In Zululand it is a particularly common species around False Bay. In South Africa it is usually a small or medium-sized tree, either bushy or straggling, or a shrub, although in tropical Africa it is reported up to 14 m. high. The bark is rough and gray or brown, the branches slender, and the young twigs covered with yellow-brown or mustard-coloured hairs...The flowers are white, lilac or purple, or sometimes 2-coloured, with a calyx that is red-brown and velvety -- as are the bracts....The fruits, ripe about April, are large -- up to 3.8 cm. in diameter -- oval, green spotted with white when young, turning purple, with a conspicuous saucer-like calyx. They are said to be inedible." [to be continued]